Attachment 2
PROCEDURES TO PREVENT HAZARDS

The information in this chapter describes procedures to prevent hazards in Pueblo Chemical Depot (PCD) hazardous waste storage areas. The minimum security procedures required at PCD by Resource Conservation and Recovery Act (RCRA) and Colorado Hazardous Waste Act (CHWA) are also described. The information provided in this section is submitted in accordance with the requirements of 6 Code of Colorado Regulations (CCR) 1007-3 § 100.41 (a)(4), (5), (8), and (9); 100.41(b)(1)(iii) and (iv). Other requirements addressed to complete this section are described in 6 CCR 1007-3 § 264.14, 264.15, 264.17, 264.31, 264.32, 264.33, 264.35, 264.73, 264.174, 264.176, 264.177, 264.198, 264.199, 264.1086, 264.1087, 264.1088, and 264.1089, PCD Standing Operating Procedures (SOPs) including SOP-PU-0000-M-486 (Rev 34) July 2, 2012, DA PAM 385-64, NFPA 780 (Annex D Inspection and Maintenance of Lightning Protection Systems and Annex K Protection of Structures Housing Explosive Materials), DoD 6055.9- STD Ammunition and Explosives Safety Standards July 1999, and other appropriate plans. The SOPs and plans contain information on the program or facility-specific procedures to prevent hazards. PCD RCRA hazardous waste storage areas consist of the following: Building 540 (non agent-related RCRA hazardous wastes) and Chemical Limited Area (CLA)/G-Block magazines G203, G1009, G1107, G1109, G1110 (agent-related RCRA hazardous wastes). The procedures relative to RCRA considerations are summarized below.

Attachment 2 addresses the following subject areas:

- Security provisions (Section 2-1)
- Inspection requirements, recordkeeping (Section 2-2)
- Design and operation of facility (Section 2-3)
- Documentation of preparedness/prevention requirements (Section 2-4)
- Preventive procedures, structures, and equipment (Section 2-5)
- Prevention of accidental reaction of ignitable and incompatible wastes (Section 2-6).

2-1 Security [6 CCR 1007-3 § 100.41(a)(4) and § 264.14]

2-1a Security Procedures and Equipment [6 CCR 1007-3 § 264.14(a)]

This section describes the procedures and equipment used to prevent the unknowing entry, and to minimize the possibility for unauthorized entry, of persons onto the PCD installation and highly sensitive areas. Security methods include surveillance systems, barriers, an entry control system, and warning signs.

2-1a(1) Surveillance System [6 CCR 1007-3 § 264.14(b)]

PCD employs a uniformed civil service security guard force to provide surveillance of the facility and to restrict the entry of unwanted or unauthorized visitors. All patrols are motorized, equipped with communications equipment, and are assigned specific areas to patrol. Typical activities include but are not limited to the following:

- Checking for intrusion or security violations
- Checking locks, fence lines, building security, and other areas within their patrol
- Challenging all persons entering or exiting the areas who may act suspicious, who are not carrying proper identification, or who are without required escorts
- Reporting all incidents to the Operations Center (OC)
- Performing specific duties outlined in the daily log for that patrol area.

All guard vehicles are equipped with first aid kits, fire extinguishers, and are assigned personal protective equipment (PPE).

2-1a(2) Barrier and Means to Control Entry [6 CCR 1007-3 § 264.14(b)]

2-1a(2)(a) Barrier [6 CCR 1007-3 § 264.14(b)(2)(i)]

PCD is entirely surrounded by a fence with secured gates. All permitted units are under lock and key when not in use. Visitors entering permitted units must be escorted while inside the building.

2-1a(2)(b) Means to Control Entry [6 CCR 1007-3 § 264.14(b)(2)(ii)]

Entry to PCD is accessible from U.S. Highway 50/Colorado Highway 96 East. On the access road, signs are posted to notify visitors they are entering a military installation. The main entrance road takes personnel and visitors to a security gate which is manned 24/7. All visitors and unregistered vehicles are challenged at the gate. Visitor passes are required. Passes are obtained from the security personnel at the security gate before proceeding. All other gates around the perimeter of PCD are kept locked.

2-1a(3) Warning Signs [6 CCR 1007-3 § 264.14(c)]

Warning signs are posted on the main access road informing all vehicle drivers that they are entering a military installation. Warning signs are posted at all five RCRA-permitted hazardous waste management units G203, G1009, G1107, G1109, and G1110. Warning signs are also posted on all four sides of the fences at Building 540. Refer to **Appendix 2-1** for photos of warning signs.

2-1b Waiver [6 CCR 1007-3 § 264.14(a)]

No waivers of security procedures or equipment requirements are requested by PCD under RCRA because the requirements continue to be met. The Army does reserve the right to change any security procedures or equipment in a manner that maintains RCRA compliance.

2-2 Inspection Schedule [6 CCR 1007-3 § 100.41(a)(5) and § 264.15(b)(1)]

2-2a General Inspection Requirements [6 CCR 1007-3 § 100.41(a)(5) and § 264.15(a) and (b)]

The buildings, equipment, permitted storage structures, and containers within PCD hazardous waste storage units are inspected according to a prescribed schedule designed to detect deterioration, tampering, malfunctions, and discharges that could cause a release of hazardous waste to the environment or pose a threat to human health. Inspections are performed on a weekly basis unless operations or other circumstances indicate a different frequency of inspection. Storage Area Inspection Log Sheets outline all areas that are inspected and provide a sample inspection record (**Appendix 2-2**). Interior inspections of the RCRA-permitted hazardous waste management units G203, G1009, G1107, G1109, and G1110 are conducted on a quarterly basis. Inspection records are maintained at the Environmental Management Office (EMO).

2-2a(1) Types of Problems [6 CCR 1007-3 § 264.15(b)(3)]

Typical inspections of permitted facilities include the following:

- Integrity check of doors, locks, and fences, plus visual verification that warning signs are in place and are legible from a minimum distance of 25 feet.

- Breaches of plastic-construction secondary containment pallets including presence of any containment cracks and/or support dimensional distortions, general condition of concrete (presence of existing and/or newly developed cracks since previous inspection, missing concrete portions due to spalling or other reasons, slab displacements upward or downward, previously repaired areas and condition of those repairs) including overhead support and floors, presence of liquid moisture inside buildings and magazines.

- Leaks or deterioration of containers

- Visible cracks, holes, gaps, or other open spaces between lids and containers

- Proper legible labeling, including content description, accumulation date(s), U.S. Environmental Protection Agency (USEPA) ID number, and applicable waste codes.

- Adequate aisle spacing such that visual inspection can occur, security of containers

- Presence of PPE, fire extinguishers, spill control kits, and eye washes where required.

- Material handling equipment

- Telephones or radios

- Detection equipment (including MINICAMS® ,DAAMS, and M-8 detection paper)

- Adequate fire-breaks and vegetation removal (mowing) around igloos (magazines), lightning terminals/conductor wire, and ventilators (rear filter housings or stacks)

2-2a(2) Frequency of Inspections [6 CCR 1007-3 § 264.15(b)(4)]

Inspections of all permitted hazardous waste storage facilities are performed at least once a week or according to another approved inspection frequency. The RCRA-permitted agent-related hazardous waste management units G203, G1009, G1107, G1109, and G1110 are inspected monthly outside the structure and quarterly inside the structure. Air monitoring is performed inside the permitted structures on a weekly basis to detect any leaking over-packed chemical munitions or other agent related wastes. Example logs sheets for the following PCD conducted inspections are found in Appendix 2-2.

Table 2-1 - Inspections Conducted on RCRA-Permitted Storage Areas at PCD

Storage Area Location	Waste Type	Inspection	Frequency
Bldg 540	RCRA Hazardous (non agent-related)	RCRA (interior and exterior)	Weekly
G203, G1009, G1107, G1109, G1110 Magazines (CLA)	RCRA Hazardous (agent-related)	RCRA Outside (exterior)	Monthly
		RCRA Inside (interior)	Quarterly
		Air Monitoring	Weekly*
		Surveillance Section	Monthly
		Surveillance Section (Semi-annual Magazine Inspection)	Semi-annual
		Chemical Operations	Monthly**
		Munitions Inventory	Annual
		Lightning Protection System	Semi-annual (visual)
			2 Years*** (electrical test)

* Also daily during Open Door Operations

** Also daily during Chemical Operations

*** Ground rod subsystem and bonding (25Ω and 1Ω max respectively) DA PAM 385-64, Table 17-1 requires every 2 years (24 mo) while NFPA 780 recommends annual testing which DA PAM 385-64 references.

For the purposes of this plan, the inspection frequencies are defined as follows:
Daily: once each calendar day, including weekends and holidays;
Weekly: once per calendar week;
Monthly: once per calendar month;
Semi-annually: twice during a 12-month calendar year not to exceed two hundred ten (210) days since previous semi-annual inspection; and
Annually: at least once during a 12-month calendar year.

2-2b Specific Process Inspection Requirements [6 CCR 1007-3 § 100.41(a)(5); § 264.15(b) and 264.1088]

2-2b(1) Container Inspections [6 CCR 1007-3 § 264.174 and 264.1086(g)(4)]

All hazardous waste containers stored in Building 540 are inspected weekly for corrosion, damage, spills, deterioration, cracks, holes, gaps, and open spaces between lid and container, and other conditions that could affect container integrity. Visual inspections of containers inside the RCRA-permitted hazardous waste management units are performed quarterly. Secondary containment pallets are inspected quarterly in the RCRA-permitted hazardous waste management units designated for liquid storage. Also, weekly air monitoring is conducted.

All containers with design capacities greater than 0.1 cubic meter (m^3) (26.42 gallons) used to store hazardous waste at PCD are managed according to the Container Level 1 standards described in 6 CCR 1007-3 Subpart 264.1086(c). Containers subject to Container Level 1 standards are stored in RCRA-permitted hazardous waste management units. No containers greater than 0.46 m^3 (121.53 gallons) are used to store hazardous waste at PCD. Container inspection procedures applied to hazardous waste containers subject to Container Level 1 standards stored at PCD will meet or exceed the inspection requirements of 6 CCR 1007-3 Subpart 264.1086(c)(4). Sample inspection logs for PCD hazardous waste storage areas are provided in **Appendix 2-2**.

2-3 Design and Operation of Facility [6 CCR 1007-3 § 264.31]

PCD constructs, maintains, and operates the facility to minimize the possibility of a fire, explosion, or any unplanned, sudden or non-sudden release of hazardous waste or hazardous constituents to air, soil, surface water, or groundwater that could threaten human health or the environment. As described in Attachment 5 Personnel Training, PCD personnel receive initial and annual training on the potential hazards as well as the protective policies and procedures instituted to minimize any potential exposures.

2-3a Fire and Explosion Minimization

In order to minimize the possibility of a fire or explosion, PCD employs a water system in the Chemical Limited Area (CLA) with seven fire hydrants with a total water availability of 250,000 gallons from two tanks (one with 200,000 gallons and one with 50,000 gallons, which are kept full and replenished by the drinking water wells to ensure adequate pressure is available to supply the fire hydrants during an emergency). The PCD Fire Department responds with two fire pumpers and a tender with the capability to meet required fire flow rate. All government vehicles are equipped with portable fire extinguishers for use on incipient fires.

The PCD Fire Department maintains radio communication capability with a base radio in the alarm room of the PCD Fire Station. Other radio communication equipment is located in the Operations Center and the Site Security Control Center. All response equipment and security vehicles have permanently mounted compatible radios, and personnel have portable radios to maintain communications at all times. These radios are tested daily to ensure good working condition. Any deficiencies identified are referred to the PCD Directorate of Information Management for immediate repair or replacement. Fire alarm systems are installed in all required facilities and have the capability to self-test daily. To ensure adequacy of these systems, the Fire Department personnel test the alarm systems on a monthly basis. Deficiencies are repaired in a timely manner utilizing alarm company contractors. Fire protection equipment is checked daily.

At PCD, a Burn Permit must be completed prior to the start of all welding, cutting, or open-flame operations or other hazardous potential fire actions. Upon completion, the Burn Permit is reviewed and approved by the Risk Management and Compliance Division (RMCD). Site Safety Inspectors perform random “on-the-spot” work process reviews for compliance. Follow on inspections are conducted as needed.

There is only one approved smoking area for PCD's CLA, between the interior and exterior fences at the Site Security Control Center. A sign designates the approved smoking area; a signed permit from the PCD Fire Department is posted; a portable fire extinguisher is in place; an approved receptacle for cigarette butts is on hand; a sign designating "No Smoking" is posted on the entrance to the CLA; and a sign is posted noting no lighters/matches at the site security entrance. Personnel are not allowed to smoke inside the interior CLA fence except in designated areas. Personnel do not handle explosive materials within the CLA in such a manner that explosive powders or residues would contaminate their clothing posing a fire hazard. Personnel are required to wash hands and practice proper hygiene before going to the designated smoking area. A no-smoking sign is also posted outside of Building 54, which also contains a fire extinguisher and emergency contact list.

Another measure to minimize fire at PCD includes vegetation control measures, which are determined by the PCD Commander through routine inspections by fire, safety, security, and ammunition surveillance personnel that evaluate, through inspections, checklists, and current conditions, the probability of combustible vegetation causing potential fire. Control of combustible materials, such as long, dry grass or brush, is designed to slow the spread of vegetation fires. To prevent fires in the CLA, a 20-foot clear zone of bare mineral soil is maintained. The roadways are maintained and provide natural fire breaks between rows of igloos as well as rows encompassing the interior fence line. The igloos specifically have fusible links installed on the vent that are designed to close the vent in the event of excessive heat to prevent fire from entering or exiting the igloos. To address tumbleweeds trapped at fence lines, PCD Public Works personnel and PCD Fire and Emergency Services personnel perform weed abatement by burning in a controlled fashion to ensure safety of personnel, equipment, and structures.

Established fire breaks at PCD consist of paved roads running east to west, adjacent to the igloos, and concrete aprons leading to each igloo access door. All ground area within the CLA is maintained as unimproved grounds. Maintenance is limited to prevent waste of natural resources and to prevent or suppress fires. These areas are kept clear of all readily combustible material, such as dry grass, wood, or brush. Igloo vents and security fences have an established 5-foot fire break.

2-3b Prevention of Hazardous Waste and Constituents Releases

PCD igloos have igloo containment systems (ICSs), which are used to protect against the release of hazardous waste or hazardous waste constituents including Mustard agent to the outside air. The ICS consists of a front filter unit, a rear filter unit with a fusible link to a fire damper actuator to prevent fire

intrusion, controller for the igloo door air-inlet by-pass damper, and seals for the igloo door, fire dampers, and drains. The system allows the natural flow of air through the igloo to carry agent vapors in the event of a leak from inside the igloo, to carbon panel adsorbers, where the vapors are contained, when the dampers are open (e.g. during normal operation). The system is equipped with a manual airflow by-pass damper (front filter housing on door) that is opened only if agent is detected in the igloo and a Mobile Igloo Filter system is deployed.

The front filter unit, containing two carbon 1 foot x 2 foot adsorber panels and one 1 foot x 2 foot pre-filter, is mounted on the inside of the igloo door as shown in **Figure 2-1**[1]. The pre-filter protects the adsorbers from fine particles that may pass through the insect screen located at the inlet vent and into the filter housing. Visual inspection items are included on the inspection forms in 2-2.

The filter unit was designed to allow in-place testing of the adsorbers from outside the igloo with the igloo door closed. Threaded couplings welded to the door exterior provide a means to connect challenge gas injection and sampling lines. Stainless steel piping extends from the various injection and sampling locations inside the filter housing to these couplings. Both front and rear filter adsorbers are designed to be operated in series with in-place testing sample ports (threaded couplings) located between the two activated carbon adsorbers.

The rear filter unit is mounted on the rear stack of the igloo as shown in **Figure 2-2**, with a rubber gasket placed between the unit and the stack. The unit contains two carbon adsorbers and one high efficiency particulate air (HEPA) filter.

The HEPA filter protects the adsorbers from particulate debris that may enter the igloo and travel upward to the rear filter unit. As the rear carbon adsorbers are larger and more costly to replace than those contained in the front filter unit, a HEPA filter was integrated into the rear filter unit to provide an added level of protection to the adsorbers. The rear filters are fully accessible and may be tested by connecting to threaded couplings located on the exterior surface of the filter housing. Both front and rear filters on the igloos will be tested (air-sampled for agent) between adsorbers after agent detection in any agent-related storage igloo. Test results along with the determination made as to whether or not the first adsorbers need to be replaced with the second absorbers and new carbon second adsorbers added will be reported to the Division within two weeks of the detection. An email to Division personnel will suffice for this purpose. Should adsorber replacement be necessary, information including the date of the

[1] All figures appear at the end of this section.

replacement, magazine number, front and/or rear filter at a minimum will also be reported to the Division. Carbon should be replaced in a timely manner when a determination is made that replacement is indicated (immediately). Replacement of filter adsorbers is accomplished via procedure outlined in IAW **PCD SOP-PU-0000-M-486, Rev 34 July 2, 2012, Appendix 4 to this Plan (PCD SOP 486)**. Records of detections, adsorber test results, determinations, Division notifications, and adsorber replacement dates will be retained on site by PCD as part of the Operating Record. The specific adsorber testing procedure will be added to the Permit in accordance with Condition I.J. of this Permit.

1000 CFM Mobile Filters – When air monitoring detects agent, these units are employed using the front door carbon filter bypass. The 1000 cfm mobile filters have active carbon adsorbers in series and are sampled IAW **PCD SOP-PU-0000-M-491, Revision 15, February 25, 2013, Appendix 1 to Attachment 3 of this Permit (PCD SOP 491)** between the adsorbers for agent breakthrough. In addition, the adsorbers are tested for the presence of preferential pathways through the carbon that would make the filters ineffective. Records of filter testing will be retained on site as part of the Operating Record. Specifics regarding the filter use, units available, testing as indicated above and test forms, and maintenance will be added to the Permit in accordance with Condition I.J. of this Permit.

2-4 Waiver or Documentation of Preparedness and Prevention Requirements [6 CCR 1007-3 § 100.41(a)(6); § 264.32 and 264.35]

The Army is not requesting any waivers for the preparedness and prevention requirements of 6 CCR 1007-3 § 264 Subpart C.

2-4a Equipment Requirements [6 CCR 1007-3 § 264.32]

The following sections address the equipment required by 6 CCR 1007-3 § 264.32.

2-4a(1) Internal Communications [6 CCR 1007-3 § 264.32(a)]

In the event of an emergency, immediate emergency notification and instruction is provided to PCD personnel, contractors, and tenants using sirens and the public address system. The OC has the primary responsibility for initiating emergency notifications. PCD has sirens with public address systems on the installation. There are also sirens with public address systems that are strategically positioned offsite. The OC has the capability of sounding the sirens individually, in any combination, or all at the same time. The PCD Fire Department, the Pueblo County Sheriff's Department, or the Pueblo Police Department can

also activate the sirens. Chemical work crews, supervisors, security guards, fire department personnel, and the OC personnel are outfitted with and monitor the communications equipment.

2-4a(2) External Communications [6 CCR 1007-3 § 264.32(b)]

In the event of a non agent-related emergency or reportable quantity hazardous material spill, the On-Scene Incident Commander (OSIC) is responsible for notifying by telephone all appropriate local, county, state, and federal agencies. External communication procedures for chemical agent accidents/incidents are also addressed in the Contingency Plan, Attachment 4 to this Permit. Most external notifications are made by telephone, cell phone, or radio.

2-4a(3) Emergency Equipment [6 CCR 1007-3 § 264.32(c)]

An extensive inventory of emergency equipment is maintained at PCD to respond to emergency situations. The Fire Department is equipped with several types of fire trucks and equipment for extinguishing fires and responding to chemical agent and hazardous material spills. Fire extinguishers are located at all permitted hazardous waste storage sites. Emergency equipment is inspected regularly and is ready for immediate deployment in the event of an incident or accident. A list of available equipment for spill cleanup is listed in the Contingency Plan, Attachment 4 to this Permit.

The permitted agent-related hazardous waste management units are fitted with passive filtration units on the door and on the rear vent. The filters protect against the release of agent vapors. The PCD ICSs are addressed in Section 2-3.

2-4a(4) Water for Fire Control [6 CCR 1007-3 § 264.32(d)]

Water for fire control at PCD is supplied primarily from a system of wells in the alluvial aquifer. The moderately permeable alluvial layer is up to 77 feet thick and underlain by Pierre Shale. The source for the water in the alluvial aquifer is primarily underflow from the north.

A grid line water supply system is used to transport the water. The following underground reservoirs and overhead tank reservoirs provide storage for fire control:

- Three 75,000-gallon gravity-fed overhead reservoirs
- One 1,000,000-gallon underground reservoir

- One 250,000-gallon underground reservoir
- One 1,500,000-gallon underground reservoir.

The reservoirs are located in various areas of PCD. Lynda Ann Reservoir collects water from Boone Creek and several springs in the southeastern part of PCD. The reservoir is 17 acres in area, and provides additional water storage for fire control.

2-4b Aisle Space Requirements [6 CCR 1007-3 § 264.35]

Proper aisle space is maintained in all PCD hazardous waste storage areas to allow visual inspection, unobstructed movement of personnel, material handling equipment (MHE), and spill control and decontamination equipment. Aisle spacing in the RCRA-permitted hazardous waste management units G203, G1009, G1107, G1109, and G1110 is 3 feet from the walls and 3 feet in between rows of pallets. Aisle spacing in Building 540 is 5 feet from walls or berms.

2-5 Preventive Procedures, Structures, and Equipment [6 CCR 1007-3 § 100.41(a)(8)]

2-5a Unloading Operations [6 CCR 1007-3 § 100.41(a)(8)(i)]

Hazards associated with handling, loading, and unloading operations are minimized through the implementation of local SOPs (**Appendix 1 of Attachment 3 of this Permit**), including **PCD SOP 486**. Hazards are also minimized by personnel receiving the proper training as required by Army Regulations and the **Training plan, Attachment 5** to this Permit. Hazardous waste containers are inspected prior to movement to make sure they are properly closed and tightly sealed. Containers are transported on pallets, and loaded and unloaded with a forklift. Ramps facilitate smooth movements of MHE in and out of storage units.

2-5b Runoff [6 CCR 1007-3 § 100.41(a)(8)(ii)]

Building 540 is divided into four sections, each with an 8-inch concrete berm. The foundation has an 8-inch berm to prevent flooding inside the building. Building 540 was constructed so that significant precipitation goes around the building and drains to the east.

The RCRA-permitted hazardous waste management units G203, G1009, G1107, G1109, and G1110 are totally enclosed, therefore runoff/run-on is not an issue. In the event of a container leak in the

RCRA-permitted hazardous waste management units, secondary containment is provided by containment pallets. Also, the floors have a 1-1/2-inch slope from the centerline toward each wall. Gutters run along the length of the RCRA-permitted hazardous waste management units. Each drain opening is plugged to prevent hazardous material from being released to the exterior environment in the event of a spill.

2-5c Protection of Water Supplies [6 CCR 1007-3 § 100.41(a)(8)(iii)]

All permitted hazardous waste storage structures at PCD are enclosed, concrete-floored structures. Building 540 is constructed on a 6-inch foundation, which serves as secondary containment. RCRA-permitted hazardous waste management units G203, G1107, G1109, G1009, and G1110 store liquid waste and have secondary containment pallets. All secondary containment is capable of retaining at least 10 percent of the container capacity or the full volume of the largest container. Spill control equipment is stored at Building 540 (when utilized).

2-5d Mitigation of Equipment and Power Failures [6 CCR 1007-3 § 100.41(a)(8)(iv)]

Emergency backup generators provide power for the Intrusion Detection Systems in the event of a power outage. PCD has numerous emergency portable generators to provide backup for any operations requiring emergency power. Building 540 does not require power. The OC has backup emergency generators to operate computers, sirens, and communications equipment in the event of a simultaneous accident/incident and power outage.

2-5e Personal Protective Equipment [6 CCR 1007-3 § 100.41(a)(8)(v)]

Various levels of PPE are worn to protect workers from chemical exposure at PCD. Department of Army Pamphlet (DA Pam) 385-61, *Toxic Chemical Agent Safety Standards,* and Army Regulation (AR) 385-10, *The Army Safety Program* specifies the proper level of PPE to be worn during different operations, which have also been incorporated into local SOPs and Appendix 3 to this Permit Attachment. Stocks of PPE appropriate for all hazardous materials managed at PCD are maintained onsite, per the specifications of the aforementioned Army regulations and procedures. Note that these levels are different from the Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH) levels specified in 29 CFR 1910.120(g)(5).

The potential for exposure of personnel to any hazardous materials or wastes during operations is minimized through monitoring and decontamination of PPE and other equipment before, during, and after

use in an area contaminated or potentially contaminated. **PCD SOP 486** and the procedures for air monitoring, **Appendix 3** to this Attachment and the **Waste Analysis Plan, Attachment 3** to this Permit are used to monitor the air in the igloos and prepare PPE for either reuse or storage for eventual disposal.

2-6 Prevention of Reaction of Ignitable, Reactive, or Incompatible Waste [6 CCR 1007-3 § 100.41(a)(9) and § 264.17]

2-6a Precautions to Prevent Reaction of Ignitable or Reactive Waste [6 CCR 1007-3 § 100.41(a)(9) and § 264.17]

All wastes that are listed as ignitable or reactive are protected from sources of ignition or reaction (e.g., open flames, smoking, welding, radiant heat, or heat from friction, sparks, spontaneous ignition). As described in **Attachment 3** to this Permit this waste includes spent high efficiency particulate air filters, laboratory solvent wastes, paint residues, and degreasing solvents. All hazardous wastes, not just the ignitable or reactive waste, are protected from ignition sources.

To prevent accidental ignition or reaction caused by a lightning strike, the RCRA-permitted agent-related hazardous waste management units G203, G1009, G1107, G1109, and G1110 are protected with a lightning protection system. This Integral Type Lightning Protection System (LPS) consists of vertical equally-spaced air terminals (aerials) bonded to a bare grounding wire (down conductor) that runs along the top of the magazine on the long axis from the rear vent stack to the headwall or front of the magazine (see Figures 2-3a, 2-3b, and 2-3c). The down conductor is attached to at least 2 grounding rods (per Table 17-2 Ground Rod Quantity Requirements, DA PAM 385-64) embedded in the ground. Grounding rods are 0.75 inch in diameter or larger and are not less than 10 feet long consisting of copper or copper-clad steel, pipe or solid rod the top of which must be at least 12 inches below the finished grade in accordance with Table 17-4 Lightning Protection Systems DA PAM 385-64.
The3/8 inch diameter as measured below the taper (Class I, buildings less than 36 feet high, per Table 17-4 Lightning Protection Systems in DA PAM 385-64) air terminal (lightning rod) on the rear vent stack is placed at least one foot (10 inches minimum required) higher than the top of the vent with a minimum aerial length for of 24 inches for each terminal at least 10 inches of which must extend above the structure (per Table 17-4 Lightning Protection Systems in DA PAM 385-64) and be bonded to the vent cap. The main conductor consists of a copper solid strip with an outside diameter of at least 0.5 inch, minimum thickness 0.051 inch, and minimum width of 1 inch (per Table 17-4 Lightning Protection Systems in DA PAM 385-64). Down conductor will also be as vertical as possible with bends not to exceed 90° and

minimum bend radius of 8 inches (per Table 17-4 Lightning Protection Systems in DA PAM 385-64). Bonding is used to reduce the possibility of side flashing and to ensure no electrical potential differences (via induction) are produced by lightning current. Bonding requirements are per NFPA 780 Protection of Structures Housing Explosive Materials Annex K and Chapter 4 DA PAM 385-64. For magazines (igloos) G203, G1009, G1107, G1109, and G1110 which are less than 36 feet in height, bonding is required for large masses of metal (400 inches square or larger surface area) located on the exterior, or within facilities and bonding is also required if the object is within 6 feet of an opening or within six feet of any part of the LPS (per Section 17-22 b(1) and B(2) Bonding in DA PAM 385-64). NFPA 780 Annex K Earth-Covered Magazines requires metal ventilators, steel doors, door frames, and steel reinforcement should be bonded to the structure's grounding system. Incoming power cables for security power should be bonded to steel reinforcement as it enters the structure per NFPA 780 Annex K.

PCD visually inspects the lightning protection system for evidence of lightning strike damage to LPS components and secure bond connections per Section 17-27 Visual Inspection Requirements DA PAM 385-64 which also references NFPA 780 Annex D Inspection and Maintenance of Lightning Protection Systems paragraph D-2. See Table 2-2 Lightning Protection System Visual Inspection Elements to be added to PCD visual inspection forms. In addition, annual resistance continuity (bonding) testing is performed to ensure the grounding system is viable (see Table 2-1 located in Section 2-2a(2) Frequency of Inspections). The required resistance for bonding testing is 1 ohm and for ground rods is 25 ohms per Table 17-1 in DA PAM 385-64. The log for this inspection is found in Attachment 2-2 and the frequency is found in Section 2-2a(2) Frequency of Inspection as per Table 17-28(a)-(f) DA PAM 385-64. Also, DA PAM 385-64 requires the earth electrode subsystem ground rods to be tested every 2 years (maximum resistance is 25Ω) and those parts that can be viewed, visually inspected annually. If there are any issues with the conditions of any of the components of the lightning protection system, the structures would fail the verification of the ground circuit continuity/bonding tests (every two years/24 months per Table 17-1 DA PAM 385-64) and the visual inspection will assist in indicating whether repair or electrical testing is necessary. There is no power going into the igloos other than what is needed for security operations, and that power is linked into the existing system through electrical service boxes and is fully grounded per NFPA 780. Inspection and Test records are maintained on site as part of Operating Permit.

Table 2-2 - Lightning Protection System Visual Inspection Elements	
1	System is in good repair.
2	There are no loose connections that might result in high resistance joints. Tighten joints to verify.
3	No part weakened by corrosion or vibration (e.g. wind).

4	All ground conductors and terminals (visible portions) are intact (e.g. non-severed).
5	All down conductors and system components are fastened securely to their mounting surfaces.
6	No additions or alterations to the protected structure that would that would require additional protection.
7	There is no visual indication of damage to surge suppression (overvoltage) devices if present.

Under Section 17-23 of DA PAM 385-64, a Lightning Warning System is utilized at PCD. A description of the elements of this system, specific criteria for terminating agent-related waste munitions operations, specific criteria for evacuation of igloos, and identification of the responsible individual who can decide when evacuation/operation shutdown is necessary per Section 17-23 Lightning Warning Systems Part a, b, c(1) and c(2) DA PAM 385-64 will be added to the Permit in accordance with the Compliance Section I.J. of this Permit.

Smoking and spark producing devices are not allowed in Munitions Storage Area A. Automatic lighters are installed in permitted smoking areas. No smoking signs are posted in the Munitions Storage Area A and Building 540. Building 540 has four quadrants to separate incompatibles. The Fire Department must issue hot work permits for all operations that involve spark- or flame-producing operations.

2-6b General Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Wastes [6 CCR 1007-3 § 100.41(a)(9) and § 264.17(b)]

A list of ignitable (D001) and reactive (D003) wastes stored in RCRA-permitted hazardous waste management units is provided in the Waste Analysis Plan, Attachement 3 of this Permit. Precautions are taken with regard to storage to ensure that ignitable and reactive wastes are not exposed to ignition sources or other conditions that could initiate a reaction (e.g., use of non-sparking tools, intrinsically safe equipment, and anti-static procedures/ equipment). No Smoking signs are posted at all permitted units. Workers are trained annually in proper handling and storage of hazardous waste. Training for PCD workers provides instruction for proper handling and protection from sources that could ignite or cause a reaction with munitions. The training for workers also provides instruction on the proper handling of munitions and related waste. General safety requirements in local SOPs including **PCD SOP 386**, reviewed with chemical workers, provide instructions for properly handling munitions.

Both the Modified Level A PPE and the Self-Contained Toxic Environment Protective Outfit (STEPO) PPE have the potential for static electricity discharge. This potential is increased in cold, low humidity environments and is a reason for additional caution when handling explosive material. Incompatible wastes are not mixed or stored at PCD.

2-6c Management of Ignitable or Reactive Wastes in Containers [6 CCR 1007-3 § 100.41(b)(1)(iii) and § 264.176]

Containers holding ignitable or reactive waste are stored in RCRA-permitted hazardous waste management units G203, G1009, G1107, G1109, G1110, and Building 540. Setbacks of ignitable or reactive waste in these areas more than exceed the requirement for containers to be more than 15 meters (50 feet) from the property line of the installation.

2-6d Management of Incompatible Waste in Containers [CCR 1007-3 § 100.41(b)(1)(iv) and § 264.177]

Incompatible wastes and materials are not placed in the same container or stored near other containers of incompatible wastes. Storage compatibility criteria, as described in 49 CFR 177 Subpart C Department of Transportation (DOT) Hazard Class (Division), are used when segregating wastes. No incompatibles are stored in the RCRA-permitted hazardous waste management units G203, G1009, G1107, G1109, and G1110. Building 540 is designed with segregated quadrants to ensure incompatibles as defined in 6 CCR 1007-3, Part 264 Appendix V, are not stored together. Drums that have previously held an incompatible hazardous material are not re-used.

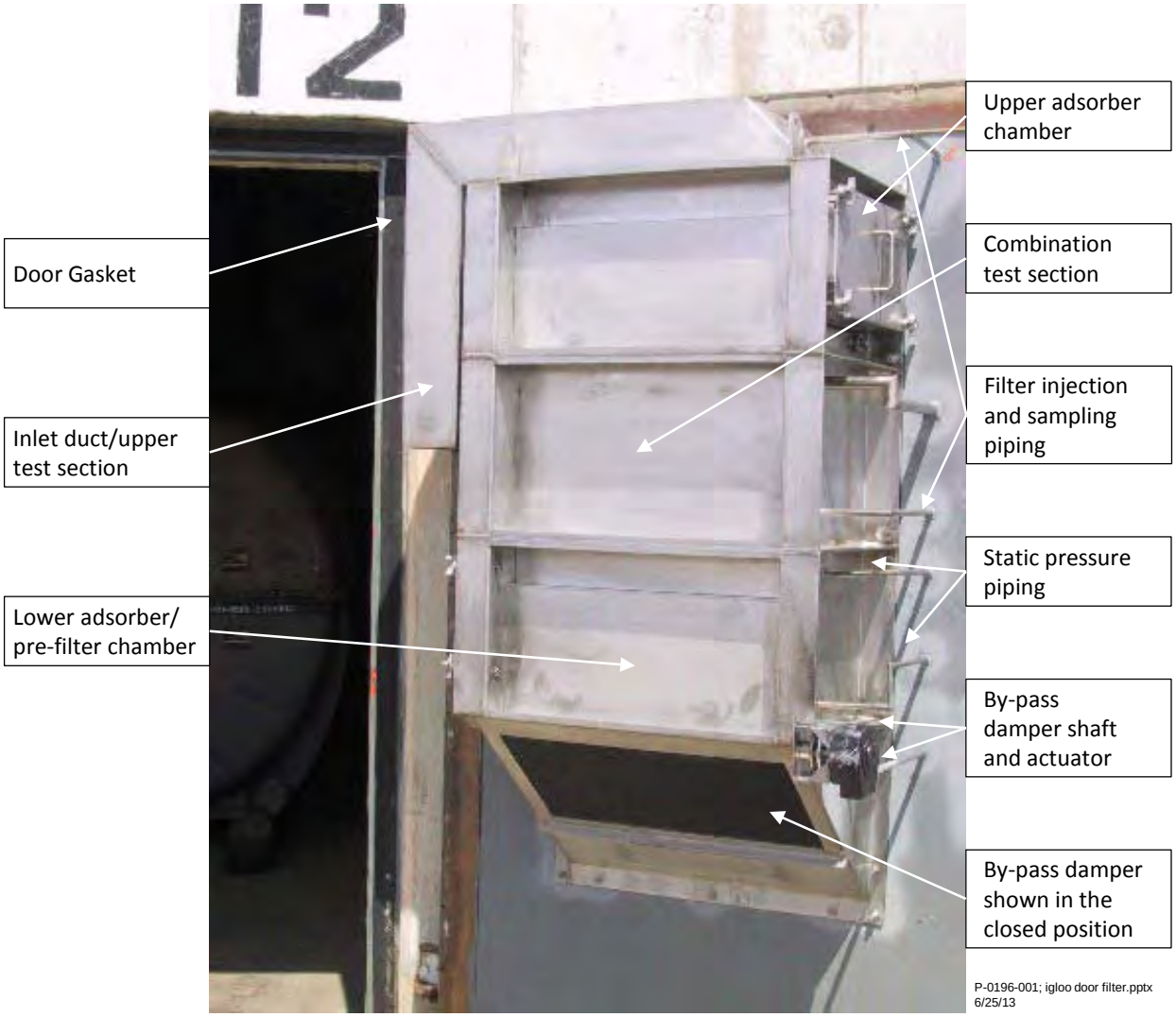

Figure 2-1. Igloo Door with Filter System Installed

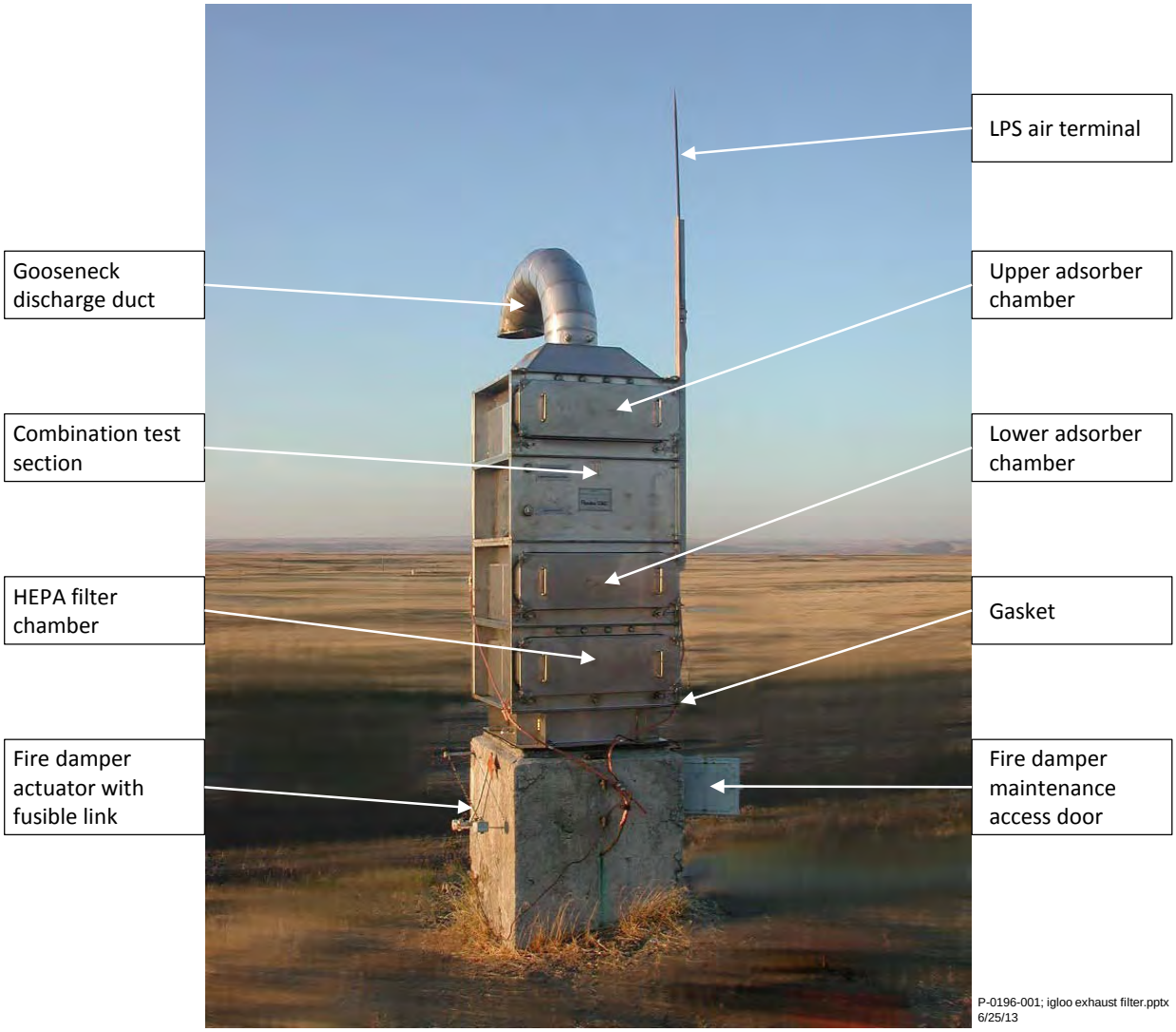

Figure 2-2. Igloo Exhaust Stack Door with Filter System Installed

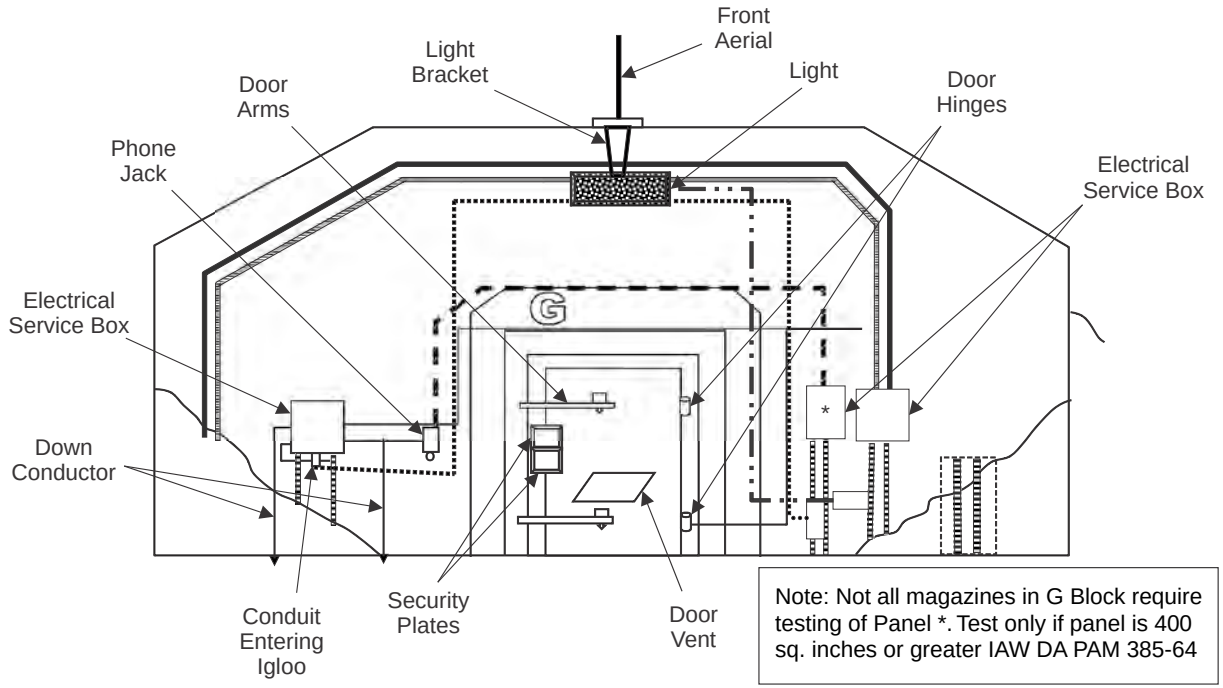

Figure 2-3a. PCD Igloo Lightning Protection System G Block Igloo Detail

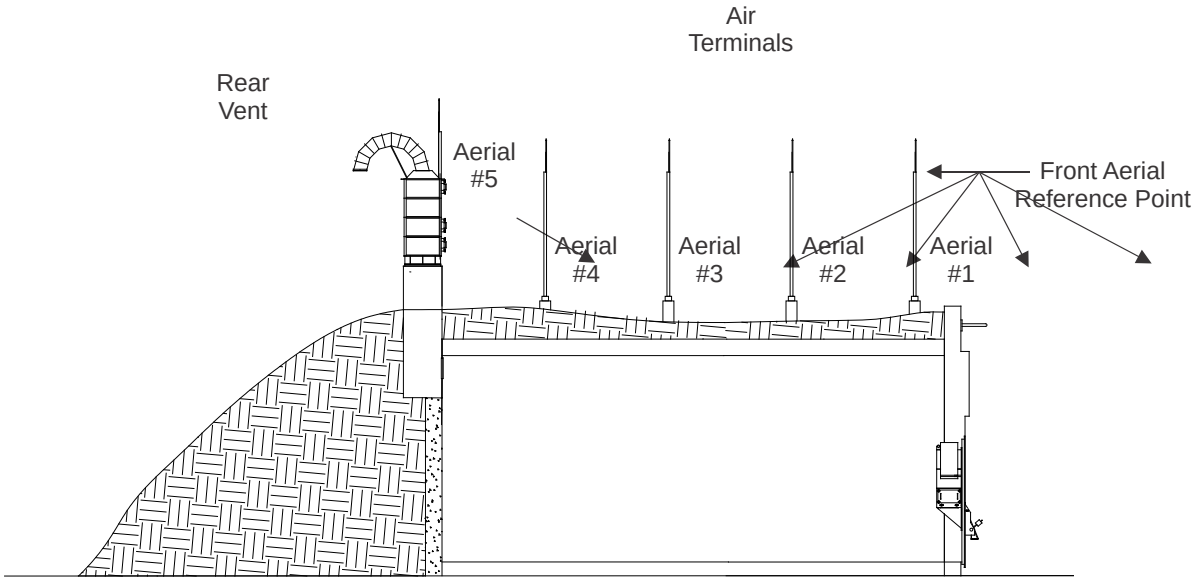

Figure 2-3b. G Block Igloo - Side View

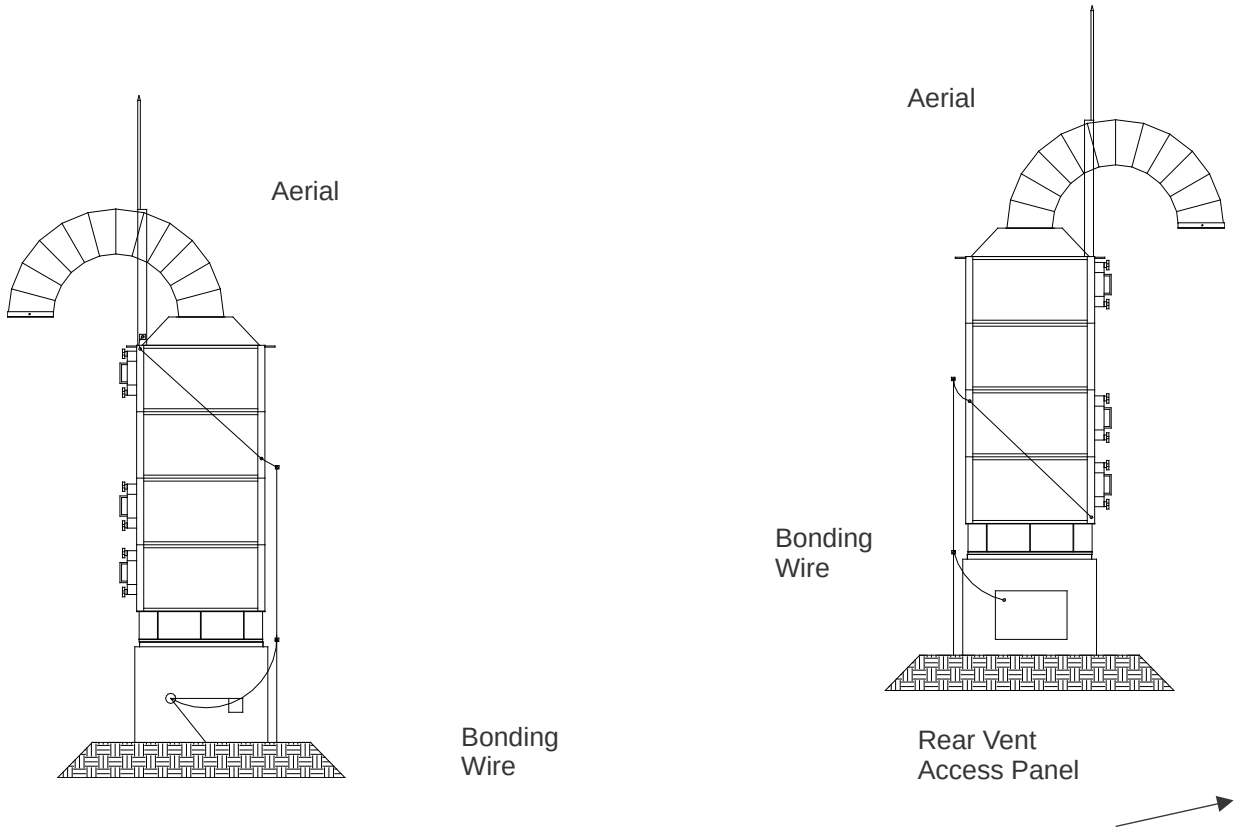

Figure 2-3c. G Block Igloo Rear Views - Vent Side

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APPENDIX 2-1

PHOTOGRAPHS OF WARNING SIGNS

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Figure 2-1-1. No Trespassing Sign

Figure 2-1-2. Restricted Area Warning Sign

APPENDIX 2-2

INSPECTION LOGS

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INSPECTION LOG						LEGEND NA - Not applicable NI - If not inspected
DATE	BUILDING NO. 540		SIGNATURE OF INSPECTOR			SIGNATURE OF DRMO
TIME						
HAZARDOUS STORAGE FACILITY (Weekly) (Daily when loading/unloading)	SAT	UNSAT	NA	NI	LOCATION AND PROBLEMS OBSERVED	DATES & NATURE OF CORRECTIVE ACTION TAKEN
Security of Doors						
Security of Windows						
Security of Gates						
Security of Fences/Warning Signs						
Hazardous Waste Facility Signs						
Evidence of Tampering						
Evidence of Damage						
Temperature Control						
Drainage and Spill Containment						
Water Pressure/Volume						
Sprinkler Systems (Flammables)						
“No Smoking” Signs						
Deterioration of Concrete						
Vegetation Around Building						
Other						

1 Figure 2-2-1. Building 540 (Sheet 1 of 3)

INSPECTION LOG						LEGEND NA - Not applicable NI - If not inspected
DATE	BUILDING NO. 540		SIGNATURE OF INSPECTOR			SIGNATURE OF DRMO
TIME						
HAZARDOUS STORAGE FACILITY (Weekly) (Daily when loading/unloading)	SAT	UNSAT	NA	NI	LOCATION AND PROBLEMS OBSERVED	DATES & NATURE OF CORRECTIVE ACTION TAKEN
PERSONAL PROTECTIVE EQPT/SPILL SUPPLIES (Weekly)						
Eye Wash Operation						
Alarm Operation						
Communication System Operation						
Fire Extinguishers						
MHE Operable/Safe for HM/HW						
Absorbents Available						
Eye Shields Available/In Use						
Emergency Clothing Available						
Protective Clothing						
Other						
CONTAINER MANAGEMENT (Weekly)						
Leaks/Spills Detected or Observed						

Figure 2-2-1. Building 540 (Sheet 2 of 3)

INSPECTION LOG						LEGEND NA - Not applicable NI - If not inspected
DATE	BUILDING NO. 540		SIGNATURE OF INSPECTOR			SIGNATURE OF DRMO
TIME						
HAZARDOUS STORAGE FACILITY (Weekly) (Daily when loading/unloading)	SAT	UNSAT	NA	NI	LOCATION AND PROBLEMS OBSERVED	DATES & NATURE OF CORRECTIVE ACTION TAKEN
Odors/Fumes Detected or Observed						
Evidence of Tampering/Damage						
Evidence Property Stolen or Missing						
Deterioration of Drums						
Proper Labeling						
Accumulation Start Dates						
Drum Inspection Signatures						
Permitted Waste Streams						
Proper Aisle Space						
Proper Storage Location						
Other						

Figure 2-2-1. Building 540 (Sheet 3 of 3)

PCD
WEEKLY CONTAINER
INSPECTION AND MAINTENANCE LOG
(Meets Subpart CC requirements)

FORM 5(b)

SWMU or Area: _____ Inspector Name: _____

Date: _____ Inspector Signature: _____

Containers	Satisfactory	Unsatisfactory
Containers secured, lids properly sealed		
Container condition, leaks, cracks, holes, gaps, or corrosion, etc.		
Containers properly placed for compatibility		
Labels	**Satisfactory**	**Unsatisfactory**
Information legible		
Proper shipping name - waste characterization		
Generator name and address		
Container document number		
EPA identification number		
Accumulation start date		

Number of Containers in SWMU or Area: _____

COMMENTS:

Figure 2-2-2. PCD Container Inspection Log

PERMITTED STORAGE IGLOOS
HAZARDOUS MATERIALS/ HAZARDOUS WASTE INSPECTION LOG

AREA: G BLOCK IGLOOS IGLOO G- _____ DATE_____ TIME_____

INSPECTOR PRINTED NAME:_____ SIGNATURE _____

CHECK LIST ITEM	SAT	UNSAT	N/A	PROBLEMS FOUND	CORRECTIVE ACTION TAKEN / DATE
EXTERIOR (MONTHLY)					
Security					
Vegetation					
Debris					
Warning Signs					
Doors					
Locks					
Fire Extingisher					
Other Observations (specify)					
Rear vent filter					
Door Vent (Circle One) Open Closed					
Rear Vent (Circle One) Open Closed					
INTERIOR (QUARTERLY)					
Secondary Containment Pans					
3 Ft Aisles					
3 Ft Center Aisles					
3 Ft Aisles at Walls					
Containers					
Pallets					
Labels - EPA Code					
Labels - Start Date					
Labels - Visibility					
Door vent filter					
Other Observations (specify)					

Figure 2-2-3. PCD Permitted Igloo Inspection Log

CHEMICAL OPERATIONS SECTION – DAILY INSPECTION CHECKLIST			
INSPECTION CHECKLIST – Igloo Number:			
Inspector Signature:			Date & Time:
Inspector Name (printed):			
ITEM	CRITERIA	OK (Y/N)	DISCREPANCY / COMMENTS
FREQUENCY: Daily During Chemical Operations			
Wind direction indicators	Operable. Located within the Chemical Limited Area (CLA) so that they are readily visible to personnel in the area.		
Material Handling Equipment and other lifting devices	Marked with load rating and date of next inspection		
Decon stocks and protective clothing required to respond to emergency situations	Adequate amount for entry into one igloo and sufficient quantities to decon one entire pallet of 155mm rounds if there was a complete release from all of them.		
Supplemental eyewash	Present and functional		
Telephone or radios	Present and functional		
Aisle space/path of travel to the nearest available exit	Unobstructed, adequate for operations.		
Fire extinguishers & other emergency equipment	Adequate; operable		
Corrective action(s) completed to resolve the above described issues will be documented with dates of completion. If more space is needed to describe inspection issues or document associated corrective actions, additional pages may be attached to the checklist.			

Figure 2-2-4. Chemical Operations Daily Igloo Checklist

CHEMICAL OPERATIONS SECTION – MONTHLY INSPECTION CHECKLIST			
INSPECTION CHECKLIST – Igloo Number:			
Inspector Signature:			Date & Time:
Inspector Name (printed):			
ITEM	CRITERIA	OK (Y/N)	DISCREPANCY / COMMENTS
FREQUENCY: Daily During Chemical Operations			
Wind direction indicators	Operable. Located within the Chemical Limited Area (CLA) so that they are readily visible to personnel in the area.		
Material Handling Equipment and other lifting devices	Marked with load rating and date of next inspection		
Decon stocks and protective clothing required to respond to emergency situations	Adequate amount for entry into one igloo and sufficient quantities to decon one entire pallet of 155mm rounds if there was a complete release from all of them.		
Supplemental eyewash	Present and functional		
Telephone or radios	Present and functional		
Aisle space/path of travel to the nearest available exit	Unobstructed, adequate for operations.		
Fire extinguishers & other emergency equipment	Adequate; operable		
Corrective action(s) completed to resolve the above described issues will be documented with dates of completion. If more space is needed to describe inspection issues or document associated corrective actions, additional pages may be attached to the checklist.			

Figure 2-2-5. Chemical Operations Monthly Igloo Inspection Checklist

MONITORING SECTION - INSPECTION CHECKLIST			
INSPECTION CHECKLIST – Igloo Number:			
Inspector Signature:		Date & Time:	
Inspector Name (printed):			
ITEM	CRITERIA	OK (Y/N)	DISCREPANCY / COMMENTS
FREQUENCY: Daily During Chemical Operations (Open Door Operations)			
Detection equipment (including MINICAMS)	Adequate; operable		
FREQUENCY: Weekly			
Igloo apron	Free of serious damage, clean		
Air monitoring lines, igloo exterior sections	Present, correctly positioned, clean and in good condition		
Detection equipment (including MINICAMS)	Adequate; operable		
Corrective action(s) completed to resolve the above described issues will be documented with dates of completion. If more space is needed to describe inspection issues or document associated corrective actions, additional pages may be attached to the checklist.			

Figure 2-2-6. Monitoring Igloo Inspection Checklist

SURVEILLANCE SECTION – INSPECTION CHECKLIST			
INSPECTION CHECKLIST – Igloo Number:			
Inspector Signature:		Date & Time:	
Inspector Name (printed):			
ITEM	CRITERIA	OK (Y/N)	DISCREPANCY / COMMENTS
FREQUENCY: Monthly			
Wind direction indicators	Operable. Located within the Chemical Limited Area (CLA) so that they are readily visible to personnel in the area.		
Fire-breaks and vegetation around igloo and ventilators	Adequate and maintained		
Rear ICS Filter Housing	Free of visible damage or deterioration that may affect performance; exterior screen intact and damper properly positioned		
FREQUENCY: Semi-Annually			
Decon stocks and protective clothing required to respond to emergency situations	Adequate amount for entry into one igloo and sufficient quantities to decon one entire pallet of 155mm rounds if there was a complete release from all of them.		
Munitions (Visual)	Dry, free of visible evidence of leakage; free of visible signs of deterioration caused by corrosion or other factors. Stored on pallets with bottom layer raised at least 3 inches above floor.		
Door	Free of damage, closes and locks, functions properly		
Front Door Vent & Filter Housing; and Rear ICS Filter Housing	Free of visible damage or significant deterioration; arm falls when released, exterior and interior screens intact and dampers properly positioned		
Fusible links	Present and correct type (160° +/- 5° F)		
Lightning rods (aerials)	No evidence of lightning strikes; ground and bond connections intact		
Stacks of munitions	Stable, level, not leaning; pallets/boxes not crushed or deformed; not contacting sides or ceiling of the igloo.		
Igloo floor	Free of any standing liquid or evidence of moisture; concrete floor free of significant cracks and sufficiently impervious to contain leaks, spills, and any accumulated precipitation until detected and removed.		
Interior arched roof and walls	Free of leaks, significant cracks or gaps (including gaps around door and vent) to allow access of precipitation.		
Igloo – Interior	No loose components of munitions, packing materials, forklifts, skids, dunnage or empty containers present. No oily rags, paint, or other flammable materials present.		
Aisle space/path of travel to the nearest available exit	Unobstructed, adequate for operations.		
Air monitoring lines, Interior to Igloo sections	Present, correctly positioned, clean and in good condition		
Corrective action(s) completed to resolve the issues described above will be documented with dates of completion. If more space is needed to describe inspection issues or document associated corrective actions, additional pages may be attached to the checklist.			

Figure 2-2-7. Surveillance Igloo Inspection Checklist

IGLOO LIGHTNING PROTECTION SYSTEM RESISTANCE TESTING and VISUAL INSPECTION LOG SHEET

G BLOCK

OHMMETER No: **S/N:** **CALIBRATION DUE: / /**		**G-203**	**G-1009**	**G-1107**	**G-1109**	**G-1110**						
		OHMMETER READING (ohms)										**Pass/Fail (Y/N)**
1	**PANEL (IDS BOX)**											
2	**CONDUIT ENTERING IGLOO**											
3	**PANEL (ELECTRIC S/W BOX)**											
4	**PANEL (SERVICE BOX)**											
5	**PANEL (SERVICE BOX see note 2)**	**N/A**										
6	**UPPER HINGE**											
7	**LOWER HINGE**											
8	**UPPER ARM**											
9	**LOWER ARM**											
10	**SECURITY PLATE**											
11	**DOOR**											
12	**DOOR VENT**											
13	**LIGHT BRACKET**											
14	**AERIAL #1**											
15	**AERIAL #2**											
16	**AERIAL #3**											
17	**AERIAL #4**											
18	**AERIAL #5 (VENT)**											
19	**REAR VENT**											
20	**REAR VENT ARM**											
21												
22												
23												
24												
25												
26												
27												
28												
29	**ARM OPERATION PASS/FAIL (Y/N)**											

Note 1: All values include the line resistance subtracted from the reading.

Note 2: Test if Service Box 5 is 400 square inches or greater IAW DA PAM 385-64

Pass/Fail Resistance: ohms

Date: / / Inspector: Line Resistance: ohms

Comments:

APPENDIX 2-3

SITE-SPECIFIC MONITORING STRATEGY FOR PUEBLO CHEMICAL DEPOT (PCD) RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) PERMITTED HAZARDOUS WASTE MANAGEMENT UNITS G203, G1009, G1107, G1109, AND G1110

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APPENDIX 2-3
SITE-SPECIFIC MONITORING STRATEGY FOR PUEBLO CHEMICAL DEPOT (PCD) RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) PERMITTED HAZARDOUS WASTE MANAGEMENT UNITS G203, G1009, G1107, G1109, AND G1110

1.0 MONITORING OPERATIONS

The PCD Toxic Chemical Laboratory (TCL) provides air monitoring support to the storage, surveillance, and maintenance operations for the chemical munitions. The overriding requirement in the design of the Laboratory and Monitoring Systems is reliable day-to-day performance. Reliability relates to the ability of the instrument and method to perform its intended function.

1.0(a) Methodology Certification and Validation

PCD complies with the ***Site-Specific Laboratory Quality Control Plan* – April, 2013 (SSQCP), Appendix 1 to Attachment 3 of this Permit** when performing air monitoring in the igloos. Analyst and operator certifications are covered by the implementation of the PCD SSQCP Section 11; the Analyst Certification Plan is described in Appendix C of the PCD SSLQCP; the Operator Certification Plan is outlined in Appendix D of the PCD SSLQCP. The first phase of certification involves the instruction of analysts, covering both theoretical concepts and practical considerations. Instruction and certification are documented for all laboratory/monitoring personnel. The second phase involves a practical exercise to determine the proficiency of the analyst/operator with the method and instrumentation.

1.0(b) Agent Air Monitoring Capability and Processes

The near real-time (NRT) monitoring of the igloos is performed in accordance **with Standard Operating Procedure (SOP) PU-OOOO-R491 Revision 15, February 25, 2013 Appendix 1 to Attachment 3 of this Permit (PCD SOP 491)** for NRT monitoring systems. MINICAMS® is the NRT monitoring instrumentation used at PCD.

NRT samples requiring confirmation are analyzed using procedures defined in PCD SOP 491 when a second NRT monitor with a dissimilar analytical column is employed for confirmation or **Standard**

Operating Procedure (SOP) PU-OOOO-465 Revision 13, February 4, 2013 Appendix 1 to Attachment 3 of this Permit (PCD SOP 465) for laboratory analytical operating procedures confirmation by a gas chromatograph/Depot Area Air Monitoring System (DAAMS) tube.

The air in storage igloos is monitored weekly for the presence of mustard vapor using the dedicated sampling ports in each storage structure headwall in accordance with the **PCD Site Specific Monitoring Plan, February 2013 Appendix 1 to Attachment 3 of this Permit (the PCD SSMP)** to detect releases and any time workers are deployed into the storage units for mission operations.

1.0(c) Confirmation Monitoring Cessation

Confirmation monitoring may be suspended once agent has been confirmed to be present (NRT-only monitoring is required to verify effectiveness of corrective actions). Once corrective actions have been resolved, confirmation monitoring shall be reinstituted. Any MINICAMS alarm, without co-located DAAMS or without a dissimilar column MINICAMS, is assumed to be agent. Any agent detection, confirmed with dissimilar column MINICAMS, or DAAMS (with a single column or dual column laboratory gas chromatography) is assumed to be agent.

The MINICAMS serves as the primary NRT agent detection instrument. In conjunction with the MINICAMS, PCD also utilizes the Real-Time Analytical Platform (RTAP), which provides mobility and environmental protection to the MINICAMS monitoring system. A mobile laboratory is equipped with two MINICAMS to provide direct, onsite NRT air monitoring within the chemical munitions storage area. The DAAMS tubes may be used to provide secondary confirmation of any agent detected inside the storage structures. The DAAMS has a preconfigured sorbent collection tube (DAAMS tube) and a sampling pump. This equipment is operated and maintained in accordance with the procedures in the PCD SSLQCP. Method certification and validation are outlined in the **PCD SSLQCP**, which covers methodology certification procedures for the equipment. Section 12 of the **PCD SSLQCP** covers the calibration of monitoring and laboratory methods. Acceptance testing of other analytical equipment (e.g., DAAMS) methodology and certification can also be found in the **PCD SSLQCP**.

1.0(d) Monitoring Strategy

1.0(d)(1) MINICAMS

The MINICAMS is an NRT monitor system with the ability to detect and report the concentration of chemical agent in the air at either low levels or high levels, dependent upon on its monitoring configuration. The MINICAMS is configured for the appropriate detection level. Employment of the MINICAMS is described in detail in the **PCD SSLQCP**. An agent detection at, or above this action level compels the workers in the immediate vicinity to mask with an M40A1 Air Purifying Respirator. The Monitoring Systems Operator records the alarm time and agent concentration, and detections at or above the action level are communicated to the PCD Operations Center. Positive MINICAMS readings for all monitoring levels outside of the Worker Population Limit ("WPL") are confirmed or refuted utilizing a second MINICAMS equipped with a different analytical column.

The MINICAMS certification process evaluates the system in a range of agent air concentrations ranging from 0 short-term exposure limit (STEL) to 2.0 STEL, and the continuing calibration and challenge elements of instrument operation validate this as an operational range. Encountering concentrations in excess of this valid range requires a different sampling technology with certification, calibration, and challenge. In areas when mustard agent is present at high concentrations, either a low volume sampler (LVS) may be utilized, or alternatively, PCD has and may employ decreased sampling volume by variation of the MINICAMS sampling time to ascertain concentrations outside of the MINICAMS certification range. PCD prefers the decreased sampling protocol because the existing certification, calibration, and challenge are applicable. The decreased sampling protocol is conducted in accordance with **PCD SOP 491**. These approaches are necessary to prevent saturation of the MINICAMS detector while providing valid data.

1.0(d)(2) DAAMS

DAAMS is an additional monitoring system used by PCD for historical monitoring and confirmation of positive MINICAMS readings at the WPL. The DAAMS is described in detail in the **PCD SSLQCP**. If a MINICAMS is not monitoring correctly, the DAAMS tubes may become the primary monitor and must be collected and analyzed. DAAMS samples provide independent confirmation of positive MINICAMS readings and a historical record of monitoring, in areas not monitored by MINICAMS, at the worker population limit (WPL).

1.0(d)(3) Nitrogen Oxide (NO_x) Filters

In order to retain chemical agent mustard on the DAAMS tube, NO_x prefilters may be necessary for mustard sample collection. If the NO_x prefilters are used on the inlet to the DAAMS tube, the prefilters

shall be used during the entire time of aspiration of the DAAMS sample. NO_x prefilters are tested by visually inspecting the prefilter for cracks, packing separation, and other physical defects.

1.0(d)(4) Distal Challenges of Sample Lines

The method and timing of distal challenges of sample lines shall be in accordance with **PCD SSLQCP**, paragraph 13.2.3.

1.0(d)(5) Passive Filter for Agent Igloos

Rear vent and front passive filter units are monitored using the provided filtering ports with an NRT monitor in accordance with **PCD SOP 491**.

1.0(e) Monitoring Levels

PCD conducts monitoring at the levels specified in **Appendix 2 Table 3-1** and as described in sections 1.0(e)(i) and 1.0(e)(ii) below to detect leaking munitions and to minimize the possibility of unplanned sudden or non-sudden releases of mustard agent to the air that could threaten human health in accordance with 6 CCR 1007-3, § 265.31 and 265.51.

1.0(e)(1) WPL Monitoring

WPL monitoring is performed in accordance with the **PCD SSMP** using either an 8-hour or 4-hour MINICAMS and/or DAAMS WPL method. WPL monitoring shall be conducted each operational day for all work areas where chemical agent may be present without secondary vapor containment and where workers do not wear respirator protection, including areas at, near, or surrounding the storage units that house the waste munitions. WPL samples are analyzed and reported as described in the **PCD SSMP**. The results of this analysis shall be validated, and if any exceedances of the WPL are determined, a report of the excursion shall be reported in writing to the Hazardous Materials and Waste Management Division within 14 days in accordance with the *WPL Excursion Response Plan*, approved by Colorado Department of Public Health and Environment (CDPHE) on July 20, 2010.

PCD commissioned a third party, U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), to conduct an industrial hygiene (IH) assessment to validate current practices. When data were obtained from the Department of Transportation (DOT) container analysis, the data were used to

determine whether current IH practices were adequate, i.e. whether or not mustard agent only monitoring was sufficient to protect workers against other hazardous waste constituents in the agent when releases occur. Studies provided to CDPHE on February 27, 2010, concluded current IH practices are adequate.

1.0(e)(2) Short-Term Exposure Limit (STEL), Action Level, and Vapor Screening Level (VSL) Monitoring

VSL monitoring is performed in accordance with the Site Specific Monitoring Plan. DAAMS, or a MINICAMS equipped with a dissimilar column, is used to confirm a VSL exceedance. When clearing items for reuse or waste determination, except for bagged items, incoming air is minimized to prevent dilution of sample when monitoring.

STEL and VSL are equivalent in terms of concentration values, but are different in that STEL is based on a 15-minute time-weighted average and VSL is independent of time. Theoretically, exceedances of the STEL for personnel are not possible because workers at PCD are trained to don the M40A1 mask when detections of agent are equal to or greater than the action level concentration (0.25 STEL). However, if exposures to workers occur that exceed the 15-minute STEL, a report of the instance, along with corrective actions, shall be provided to the Hazardous Materials and Waste Management Division within 14 days.

Appendix 2 Table 3-1. Monitoring Levels

Airborne Exposure Limits	Mustard Agent (mg/m^3)	Mustard Agent STEL Equivalent
IDLH (30 minute limit)	0.7	233
STEL (15 minute limit/day)	0.003	1.0
WPL (4 hour limit/day)[a]	0.0008	0.27
WPL (8 hour limit/day)[a]	0.0004	0.13
GPL (12 hour limit/day)[b]	0.00002	0.007
M40 Action Level (masking point)[a]	0.00075	0.25
SCBA Action Level (masking point)[c]	>0.006	>2.0
VSL[d]	0.003	1.0

Notes:

[a] Powered filtration is utilized, in accordance with SOP PU-0000-M-486, on storage structures with agent concentrations > 0.25 STEL; personnel are masked when working in storage structures with agent concentrations > 0.25 STEL.

[b] Historical monitoring typically is used for time-weighted average (TWA) monitoring where the sample analyzed represents an extended time period, for example, 8 or 12 hours. Results are not known until laboratory analysis is completed after the sampling event. Airborne exposure limits (AELs), using historical monitoring, are set at levels at which health effects are not expected to occur for most workers. Exposures above WPL-8, but below the STEL, likewise are not expected to result in significant health effects since the WPL is a chronic exposure limit. PCD tracks the historical frequency of all confirmed detections above the WPL to ensure the workers involved in agent operations are not routinely exposed to mustard above the WPL. Any exceedance of mustard agent above the WPL is managed in accordance with the PCD WPL Excursion Plan listed in Section 8 of the PCD SSMP.

[c] M40 respirator use is authorized in environments ≤ 2.0 STEL as based on hazards associated with the use scenario, airborne concentration, and the task duration. Daily maximum use limits for the M40 mask in environments above the WPL are in accordance with DA Pam 385-61, Table 4-2.

[d] Vapor Screening Limit equals one cycle, or a single MINICAMS® result used to monitor encapsulated materials for determination of residual agent contamination levels.

GPL = general population limit
IDLH = immediately dangerous to life and health
mg/m^3 = milligram per cubic meter
SCBA = self-contained breathing apparatus
STEL = short-term exposure limit
VSL = vapor screening level
WPL = worker population limit

1.0(f) Equipment Operation, Maintenance, and Repair

The PCD Monitoring/Laboratory Branch is a component of PCD's Chemical Operations Directorate and is responsible for all air monitoring operations, including routine open-door or closed-door operations, and training and certification of the assigned monitoring systems operators. The Monitoring/Laboratory Branch also maintains, services, and repairs PCD's air monitoring equipment to a designated level of precision and accuracy in accordance with the **PCD SSLQCP**.

In accordance with the limiting conditions of operation (LCOs) in the **PCD SSMP**, a minimum number of RTAPs equipped with fully functional MINICAMS are required to be maintained by the Monitoring/Laboratory Branch at all times.

The laboratory ventilation system is tested semi-annually in accordance with procedures detailed in Department of the Army Pamphlet 385-61, Section 8.

PCD implements corrective actions for all monitoring equipment and filters in accordance with the procedures in the **PCD SSLQCP**.

Appendix 2-4

PCD SOP 486 Rev 34

SOP COVER SHEET
1. PUEBLO CHEMICAL DEPOT
STANDING OPERATING PROCEDURE FOR:

2.	ITEM:	3.	OPERATION: Chemical Operations
a.	Ctg. 105MM, M60 HD, 1315-C442	4.	ESTIMATED DAILY PRODUCTION RATE: N/A
b.	Proj. 105MM M60 HD 1315-C442	5.	ORGANIZATIONAL SYMBOL: CMPC-CD
c.	Proj. 155MM, M110 HD 1320-D543	6.	SOP NO: PU-0000-M-486 Date: 12 Apr 65
d.	Proj. 155MM, M104 HD 1320-D484	a.	REV NO: 34 Date: JUL 2 2012
e.	Ctg. 4.2" M2 HT, 1315-C698	b.	CHANGE Date:
f.	Ctg. 4.2" M2A1 HD 1315-C703	7.	AUTHORITY: DA PAM 385-61 (17 Dec 2008); AR 385-10 (23 Aug 2007); and AMC-R 700-107 (03 Feb 2003)
g.	Packaged chemical munitions are (12) 1.2		
h.	Unpackaged chemical munitions are (12) 1.2		
i.	Chemical hazard symbol 1, set 1, and H		

8. PREPARED BY: Jill Fahrion — 20 Jun 12 Date — Title: Production Controller — Phone Ext: DSN: 749-4648

9. REVIEWED BY: Hawkins M. Conrad — 20 Jun 12 Date — Title: Director, Chemical Operations — Phone Ext: DSN: 749-4259

10. SUBMITTED BY: Hawkins M. Conrad — 20 Jun 12 Date — Title: Director, Chemical Operations — Phone Ext: DSN: 749-4259

11. CONCURRENCES:

OFFICE	SIGNATURE/DATE	TITLE
Chemical Operations	Hawkins M. Conrad	Director, Chemical Operations
QASAS/Surveillance Office	Lisabeth A. Wachutka 20 Jun 12	Manager, QASAS
Occupational Health Clinic	Robert W. Weien, MD 6/20/12	Competent Medical Authority
Chemical Surety Compliance	Nancy D. Wisthoff 20 Jun 2012	Chemical Surety Officer
Environmental Management Office	Christopher J. Pulskamp 6/20/12	Acting Manager, Environmental Management Office
Safety & Occupational Health Office	Randy J. Wojtala 20 Jun 2012	Manager, Safety & Occupational Health
Public Works	Edward J. Dunn 6/20/12	Director, Public Works
Logistics	Carlos B. Estrada 20 Jun 12	Acting Director, Logistics

12. APPROVAL: _____ DATE: 2 JUL 12
TIMOTHY M. GREENHAW
LTC, CM
Commanding

13. Annual Review:

DATE	SIGNATURE	TITLE

SOP NO: PU-0000-M-486 REV 34 CHG ____ DATE JUL 2 2012

STANDING OPERATING PROCEDURE
SUBMITTAL SUMMARY SHEET
Proponent is Chemical Operations Division

Installation: Pueblo Chemical Depot, Pueblo, Colorado Date Submitted: ____

SOP No. PU-0000-M-486

Reason for Submittal:

____ New

XX Revision (see Remarks)

____ Change: ____ (see Remarks)

Procedures Involve Material that is:

Explosive XX

Inert ____

Toxic Chemical Munitions XXX

Type SOP

XX Maintenance (Renovation, Modification, Supervisor)

XX Preservation & Packing

____ Demilitarization

XX Receipt, Storage and Issue

XX Inspection/Surveillance Test

____ Administrative

____ Other: Protective Ensemble

Operation Covered by SOP

____ Operation is underway and will conclude

____ Operation is scheduled to start on or about

XX Operation is conducted intermittently

XX Operation is conducted on a continuing basis

Hazard Analysis

XX Is required for critical operation number(s) ALL

_____ Is not required

XX Is available in the Risk Management Office

_____ Is not available

XX Hazard Analyses were performed by PCD HAWG

SOP Validation, AMC-R 700-107

Phase 1 was accomplished _____ was not accomplished _____

Phase 2 was accomplished _____ was not accomplished _____

Phase 3 was accomplished _____ was not accomplished _____

Validation not required XX

SOP NO: PU-0000-M-486 REV 34 CHG _____ DATE JUL 2 2012

SOP

SUPERVISOR'S STATEMENT

1. The supervisor will sign this statement:
   a. When first assigned as supervisor of the operation.
   b. When an approved change is made to the SOP.
   c. At least once per quarter during continuing operations.
   d. After absence from the job in excess of 15 consecutive workdays.
2. I have personally reviewed each of the operational steps of the SOP and have no question in my mind that the operation can be performed safely, efficiently, and in compliance with environmental restrictions noted in the SOP. I have verified to my satisfaction that operators have been trained and are capable of performing their part of the operation in a safe and efficient manner and have instructed them to follow the SOP without deviation.

SUPERVISOR'S PRINTED/TYPED NAME: _____

SUPERVISOR'S SIGNATURE	DATE

SOP

OPERATOR'S STATEMENT

1. The operator will sign this statement:
   a. When first assigned to the operation.
   b. When an approved change is made to the SOP.
   c. At least once per quarter during continuing operations.
   d. After absence from the job in excess of 15 consecutive workdays.
2. I have read or have had read to me and understand the general and specific safety and environmental requirements, the personnel and explosive limits, and the work description and inspection requirements necessary to accomplish my operation. I have been thoroughly trained in, and am familiar with, my part of the operation and I agree to abide by these instructions throughout my assignment to the operation.

NAME/SIGNATURE	DATE	OPERATION NUMBER

SOP NO: PU-0000-M-486 REV 34 CHG _____ DATE JUL 2 2012

INDEX OF OPERATIONS

1. REMARKS:

a. Revision 32 of SOP-PU-0000-M-486, Chemical Operations, incorporates changes to igloo vent closure procedures, secondary hotline set-up procedures, secondary waste decontamination procedures, VCC set-up/operation procedures, over-pack inspection procedures, and Safety/Surveillance recommended changes.

b. Revision 32, Change 1 updates signature page and adds SOP header. Incorporated Secondary Hotline layout and Preventative Measures Heat Strain Appendices.

c. Revision 33 of SOP-PU-0000-M-486, Chemical Operations, updates signature page, references and general safety requirements. Incorporates changes for Operation 2, Step 3, Safety Operator(s) duties; and changes for Operation 3, Step 6; Closure and secure Igloo. Updates Operation 6 based on new requirements of AMC-R 740-28. Modified operational steps for the 1000 CFM, Operation 13. Incorporates minor procedural changes identified in the annual review.

d. Revision 34 of SOP PU-0000-M-486, Chemical Operations, updates the signature page, makes changes and additions to the general safety requirements, revises operational and transient personnel limits for Operations 2 through 11, removes the requirement for a "door watch" from Operation 2 for open door operations, removes operations not specific to the Chemical Operations Directorate (Inventory, SMI, and Magazine Inspection), and modifies operational steps for the 1000 CFM (operation 10). Pages and operational references have been renumbered accordingly due to the removal of the above listed operations.

2. REFERENCES:

a. AMC-R 350-4, Training and Certification Program for Personnel Working in Ammo Ops

b. AMC-R 385-100, Safety Manual

c. AMC-R 700-107, Preparation of Standing Operating Procedures for Ammunition Operations

d. AMC-R 740-28, Toxic Chemical Munitions and Bulk Agent Inventory and Accountability

e. AEHA Technical Guide No. 146, Pentachlorophenol-Treated Materials Handling and Disposal

f. AR 50-6, Chemical Surety

g. AR 200-1, Environmental Protection and Enhancement

h. AR 385-10, The Army Safety Program

i. DA PAM 40-173, Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Mustard Agents H, HD, and HT

j. DA PAM 50-6, Chemical Accident/Incident Response and Assistance (CAIRA) Operations

k. DA PAM 385-30, Mishap Risk Management

l. DA PAM 385-61, Toxic Chemical Agent Safety Standards

m. DA PAM 385-64, Ammunition and Explosive Safety Standards

n. FM 3-5, NBC Decontamination

o. FM 3-21, Chemical Accident Contamination Control

p. TB 43-0142, Safety Inspection and Testing of Lifting Devices

q. PCD Form 40-173, Site Entry Record

r. PCD-R 40-1, Hearing Conservation

s. PCD-R 40-2, Ergonomics

t. PCD-R 40-20, Respiratory Protection Program

u. PCD-R 50-3, PCD Site-Specific Monitoring Plan

v. PCD-R 50-4, Equipment Decontamination Plan

w. PCD-R 385-9, Management, Inspection, and Safe Use of Lifting Devices

x. PCD-R40-506, Vision Conservation and Readiness

y. PCD-R 385-12, Occupational Safety and Health Program

z. PCD-R 385-507, Occupational Safety and Health Prevention of Heat Stress Related Illness

aa. SB 742-1, Ammunition Surveillance Procedures

bb. SOP PU-0000-W-465, Toxic Chemical Laboratory Analytical Operating Procedures

cc. SOP PU-0000-R-491, Near Real Time Monitoring Systems Technical Operating Procedures

dd. SOP PU-0000-M-501, Protective Equipment

ee. TM 10-8415-231-12 & P, Operator's and Unit Maintenance Manual for Self-Contained Toxic Environment Protective Outfit

ff. TM-3-220, Chemical Biological and Radiological (CBR) Decontamination

gg. TM 3-250, Storage, Shipment, Handling and Disposal of Chemical Agents and Hazardous Chemicals

hh. TM 3-4230-209-10, Decontamination Apparatus: Power Driven, Skid Mounted, 500 Gallon, M12A1

ii. TM 10-8415-232-23 & P, Unit and Direct Support Maintenance Manual Personal Ice Cooling System (PICS)

jj. Flanders/CSC Installation, Operation, Maintenance & Spare Parts Manual

kk. Interspiro 9030 Operation Instructions

ll. Medical Management of Chemical Casualties Handbook

mm. Mobile Personnel Decontamination System with System Upgrade Package Operations and Maintenance Manual

nn. OASA (I&E) Memorandum, Subject: Implementation Guidance Policy for New Airborne Exposure Limits for GB, GA, GD, GF, VX, H, HD, and HT, dated 18 June 2004.

oo. STEPO Technical Data Package

pp. U.S. Army Chemical Materials Agency Letter of Instruction For Use Of The 7-inch by 27-inch Single Round Container (SRC)

qq. U.S. Army Chemical Materials Agency Letter of Instruction For Use Of The 9-inch by 41-inch Single Round Container (SRC)

rr. U.S. Army Chemical Materials Agency Letter of Instruction For Use Of The 12-inch by 56-inch Single Round Container (SRC)

ss. PCD Monitoring and Inspection Compliance Plan (MICP)

3. GENERAL SAFETY REQUIREMENTS:

a. A copy of this Standing Operating Procedure (SOP) shall be available at the operation site. Supervisory personnel shall maintain copies of a complete Standing Operating Procedure and be responsible for the enforcement of its provisions.

b. There will be no deviation or change from this SOP without formal staffing and approval. If operational situations occur that have not been addressed in this SOP, a change will be made and approved prior to resumption of operations.

c. Employees will not tamper with any safety devices or protective equipment.

d. For any defect or unusual condition noted that is not covered by this SOP, field operations will stop: the Site Lead/Supervisor will report findings to the appropriate personnel: Manager, QASAS/Surveillance Office (4159), the Safety and Occupational Health Office (4533), and/or the Director, Chemical Operations (4259) to determine the corrective action prior to resuming operations.

e. The supervisor is responsible to report all injuries and accidents occurring within their area of responsibility to the Safety and Occupational Health Office (4533) and to the Operations Center (4211). The report will first be telephonic, followed by completion and forwarding of the proper forms for the type of injury or accident.

f. All fires occurring in the vicinity of ammunition or explosives shall be reported and fought immediately with all available means and without awaiting specific instructions. However, if the fire involves explosive materials or is supplying heat to it, or if the fire is so large that it cannot be extinguished with the equipment at hand, personnel shall evacuate a minimum of 450 meters or the distance equal to three (3) magazines away. The person discovering the fire will notify the Operations Center (4211).

g. Portable equipment and hand tools used in agent operations must be identified by a permanent marking system that cannot be removed through further use in agent operations, decontaminations, or maintenance. Storage of such items should be segregated from items that have not been used in agent operations.

h. The Operations Center will serve as the central control point for coordination of emergencies and will be informed of all agent operations.

i. Eye decontamination of liquid agent will be conducted prior to evacuation. Flush the eyes immediately with water (not soap or bleach) utilizing a 15-minute eyewash station. Supplemental eyewash will be used to supplement the 15-minute eyewash station as necessitated by the situation. If using supplemental eyewash, tilt the head first to the side before pulling the eyelids apart and pour water slowly into the eye.

j. Any agent exposure, suspected agent exposure, agent spill or release, or other abnormal situations that may result in personnel injury must be reported to supervisory personnel immediately after emergency action is taken. Personnel with possible agent exposures will report for medical evaluation as soon as possible.

k. Care will be taken to limit the potential exposure of a minimum number of personnel, for a minimum period of time, to a minimum amount of hazardous material consistent with safe and efficient operations.

l. Workers will have an unobstructed path of travel to the nearest available exit. Individuals will ensure area in immediate vicinity is clear of debris, personnel will be aware of surroundings.

m. Work locations will be maintained in a neat and orderly condition.

n. All workers will have a pre-employment and periodic physical exam and be cleared by the Competent Medical Authority (CMA) to wear Protective Clothing and Equipment (PCE).

o. Personnel who work in agent operations will report to work with their face clean-shaven so that an adequate seal can be obtained and maintained between the face and the protective mask.

p. Personnel with open sores will have them evaluated at the Occupational Health Clinic (OHC) and, based on evaluation, the open wound may be treated in a manner that would allow access to chemical limited/exclusion area.

q. Personnel involved in agent operations will not wear contact lenses. Visitors and transients who would normally only don protective mask for evacuation are exempt from this requirement.

r. Eating, drinking, chewing (to include chewing tobacco), applying cosmetics (makeup, lip balm), and smoking within the chemical limited area (CLA) are permitted only in specifically designated locations. Food, non-alcoholic beverages, chewing gum, and tobacco products may be carried through the CLA directly to buildings 485, 492, or 475 for consumption and use during mealtime and breaks.

s. A single covered container of water or other suitable liquid replenishment and disposable cups may be located not less than 100 feet upwind from an outdoor operating site.

t. All personnel engaged in material handling operations will wear safety footwear.

u. Leather or leather-palmed gloves, safety glasses and face shield will be worn during banding operations. Leather or leather-palmed gloves will be worn when contacting munitions boxes or pallets, or when handling any other item that could cause punctures or damage to butyl gloves or the hands.

v. All hand tools shall be maintained in a good state of repair.

w. Chemical ammunition to be moved will be physically counted by inventory personnel when loaded into the Modified Ammunition Van (MAV) and again upon arrival at the destination.

x. The work area will be clearly defined and access limited to authorized personnel only who have received appropriate safety training or are accompanied by someone who has been trained.

y. Work not necessary to the operation, will not be performed in the areas of agent operations.

z. Adequate operable detection equipment and materials must be maintained at all work areas. Wind-direction indicators must be provided at all areas and located so they are readily visible to area personnel.

aa. Telephones, radios, or other means of communications for advising the Operations Center of Emergencies must be available at the worksite.

bb. Decontamination and first-aid equipment will be positioned at all agent operations sites. Designated personnel will be trained to operate this equipment in the event of an emergency.

cc. A vehicle suitable for patient transport will be readily available at the job site whenever operations are in progress.

dd. At each job site, one individual will be designated as the Safety Person to assure that the equipment and supplies are available and properly positioned; The Safety Person will monitor communications equipment; assist personnel in donning protective clothing and check for proper fit; complete the Site Entry Record in accordance with form directions; monitor time in chemical protective ensembles; and assure protective clothing is properly doffed and decontaminated per guidance.

ee. A minimum of two people knowledgeable in agent exposure symptoms, self/buddy aid, and treatment must be present during agent operations. They will remain in visual contact with each other at all times.

ff. All personnel working with agent will be give an off-duty telephone number to which suspected exposures can be reported.

gg. Workers will report any illness to the supervisor prior to start of daily operations or before leaving the job if the illness occurs during working hours.

hh. Operators lifting material will use proper safe handholds, assume proper lifting positions, avoid sharp objects, and avoid twisting when lifting or carrying. Employees shall not lift over 45 pounds without mechanical assistance or the use of the "buddy system".

ii. Personnel will be aware of snakes and insects while inspecting interior and exterior of structure. Use caution and be aware of hazards associated with climbing the exterior of igloo and be attentive to conditions of terrain, especially during snowy or icy conditions.

jj. Heat and flame producing items are prohibited in the chemical limited area unless accompanied by the appropriate permit. The only exception is the flame photometric detector used in MINICAMS.

kk. Paint thinners, oily rags, and other highly flammable materials will be kept in approved, closed receptacles and be clearly marked.

ll. Material Safety Data Sheets will be kept readily available at Building 475.

mm. When operations have been completed, all personnel will proceed to the change house (for removal of clothing and showering prior to donning personal articles of clothing). Personnel who have been in areas of possible chemical agent exposure (normally personnel downwind of an agent release or personnel who were in areas of known agent contamination) or injured will be decontaminated and quadrant monitored IAW published CMA Quadrant Monitoring policies before departing the CLA. All possible exposed workers will be immediately referred to the medical facility for medical evaluation by PCD OHC Competent Medical Authority (CMA).

nn. Proper PPE/PCE will be worn in accordance with this SOP, MSDS, or other applicable regulations and policies.

oo. Butyl rubber products that come in contact with petroleum products will be disposed of

pp. The work rest cycle and fluid intake will be in accordance with PCD-R 385-507, Occupational Safety and Health Prevention of Heat Stress Related Illness.

qq. A ground guide/spotter will be utilized during vehicles backing up and all forklift operations movements involving toxic chemical agents.

rr. Materials Handling Equipment (MHE) operators will have a valid operator's permit for the particular piece of equipment being utilized in their possession or at the change house. Seat belts will be used at all times. Forklifts will be operated in a safe manner and will not be used to transport personnel. Load backrest guard may be removed/modified only if the requirements of PCD Reg. 385-9 are complied with.

ss. Operators will ensure the MHE is in proper working condition and report discrepancies to supervisor and annotate on the trip ticket. MHE will not be operated until discrepancies are corrected.

tt. Type E, EE, ES, and EX rated battery-powered equipment is satisfactory for handling all classes of ammunition and explosives packed in accordance with Department of Transportation Regulations.

uu. MHE and other lifting devices will have the load rating and date of next inspection marked on them. The load rating will not be exceeded. TB 43-0142 and PCD-R 385-9 require that equipment not be used without a current inspection date.

vv. Adequate stocks of decontaminants and protective clothing required to respond to emergency situations must be maintained at the installation.

ww. Used decontaminating solutions will be collected, sampled and packaged IAW the PCD Hazardous Waste Management Plan and stored in a hazardous waste storage site.

xx. Workers may enter an agent area unmasked to perform static operations (i.e., visual inspection without handling or touching the rounds, containers, or pallets) if the storage igloo is being monitored with near real time monitors and the results indicate the agent concentration is below the set alarm level. First entry monitoring also will be completed prior to operations.

yy. Normally, only two operators may enter an igloo to perform first entry operations. An additional operator may enter the igloo when being trained on-the-job. Transient personnel may enter during first entry operations only when they have a need such as DAIG, SMR, and local safety and QA inspectors.

zz. Low level monitoring with MINICAMS will be conducted in accordance with SOP PU-0000-R-491 the entire time that operators are in the structure.

aaa. Lightning protection and storm warning response procedures will be conducted in accordance with the Installation Emergency Management Plan.

bbb. For operational efficiency, multiple operations may be scheduled simultaneously for a given open door location. However, only similar operations (i.e. SMI, Inventory, and Magazine Inspection) may be conducted simultaneously inside the storage location. All other operations (to include Distal Line Challenges and IDS checks) will be sequenced such that no two dissimilar operations will be conducted inside the storage location at the same time.

ccc. Approvals for deviation, waivers, and exemptions' of standards addressed in this SOP will adhere to DA PAM 385-30 and PCD's Risk Management, System Safety Engineering Management Plan.

ddd. For life threatening situations involving non leaker operations, personnel in Level D (with butyl rubber gloves, boots and mask worn) can render assistance for emergency escape only.

eee. Operator personnel limits stated for each operation in this SOP apply to all personnel inside or outside the storage structure that are required to perform the operation. If simultaneous operations are being performed under a separate procedure/SOP (such as air monitoring of the storage structure), and that procedure establishes separate personnel limits, personnel performing the simultaneous operations under separate procedure will be excluded from the personnel limits established in this SOP.

fff. At any time an operator encounters a piece of equipment that is not functioning properly or functioning outside of established parameters, the operator will cease to continue to perform operations requiring that piece of equipment until such time that it is functioning properly or can be replaced.

4. ENVIRONMENTAL CONSIDERATIONS:

a. General Requirements: Consideration must be given to controls when performing operations which affect air, soil, surface water, and ground water. The environmental office must verify that specific requirements and limitations are met. Limitations and restrictions contained in those documents will be put into an environmental portion of the local Standing Operating Procedure (SOP).

b. Emission Control: Operations should be planned to eliminate or restrict, to an acceptable minimum, any procedures that would produce residues or emissions hazardous to health or environment. Residues created must be disposed of by a safe and environmentally acceptable means.

c. Technical Assistance: Technical assistance with respect to these health and environmental restrictions can be obtained from the Environmental Office, Pueblo Chemical Depot, ext. 4201.

OPERATIONS FORMAT

A. STANDING OPERATING PROCEDURE FOR: **Chemical Operations**

B. OPERATION NO.: 1

C. BAY NO.: N/A

D. SOP NO.: PU-0000-M-486 DATE: 12 Apr 65

E. REV NO.: 34 DATE: JUL 2 2012

F. CHANGE NO.: DATE:

G. OPERATION: **Pre-Operational Procedures**

H. EXPLOSIVE LIMITS: UNITS: N/A EXPLOSIVE LBS.: N/A

I. PERSONNEL LIMITS: OPERATORS: N/A TRANSIENTS: N/A

J.

STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY (S), OPERATIONAL (O), QUALITY CHARACTERISTICS (QC)).
1.	Operations are conducted in accordance with the Training and Operational calendar.	1a. (O) Operations are conducted in accordance with the Training and Operational calendar.
		1b. (O) Complete Daily Operational Worksheet. Worksheet shall include date, operation, and the location of operation for the day. Worksheet will also include name, position, level of dress and the individual badge number. This worksheet will be provided to: Operations Center, Occupational Health Clinic, Chemical Surety Office, Safety and Occupational Health Office, QASAS/Surveillance Office, Security Operations Branch, Desk Sergeant, Protective Clothing and Director of Chemical Operations.
2.	Perform Equipment Checks. NOTE: Inventory of tools will be maintained to validate decontamination status and history.	2a. (O)(QC) Verify that tools and equipment are serviceable and calibrated prior to use. Tools and equipment used in toxic chemical operations must be identified by a permanent marking system that cannot be removed through further use in agent operations, decontamination, or maintenance. Storage of such items should be segregated from items that have not been used in agent operations. If tools or equipment come into contact with liquid agent, they will be decontaminated, monitored, marked and used at the XXX level (monitoring results will meet requirement of DA-PAM 385-61).

STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY (S), OPERATIONAL (O), QUALITY CHARACTERISTICS (QC)).
2.	Perform Equipment Checks. (con't)	2b. (O)(S)(QC) Forklift driver will have current license. Verify that all forklifts used in operations have current load tests/inspection due date IAW TB 43-0142 and PCD-R 385-9. All vehicles and handling equipment will be inspected before use and periodically during shift for conditions that would render equipment unfit or unsafe for use. Trip tickets and forklift function checks will be properly documented.
		2c. (O)(QC) M8 Detection Paper: Verify that sufficient quantity and two different lots are available to complete the day's operation. Ensure that M8 complies with shelf life requirements and is handled IAW MSDS.
		2d. (O)(QC) Inspect operating vehicles for serviceability. Verify that one vehicle is suitable for use as an emergency vehicle.
		2e. (O)(QC) Verify that an adequate quantity of Sodium Hypochlorite (5% nominal) is available at the site (8 gallons as a minimum is recommended) and that bleach expiration date has not passed.
		2f. (O)(QC) Verify that two general purpose type 10BC or ABC fire extinguishers are serviceable. The fire extinguishers will be placed on either side of the magazine apron prior to start of operations that involve handling/movement of munitions.
		2g. (O)(QC) Verify that radios to be used are charged and serviceable. Perform communications checks.
		2h. (O)(QC) Verify that audible alarms are present and serviceable.
		2i. (O)(QC) Verify that portable eyewash unit is filled with fresh distilled or potable water by physically checking the water level. Verify that the unit is tagged indicating the unit has been inspected/serviced in accordance with water preservative guidance.
		2j. (O)(QC) Verify that flashlights are serviceable.
		2k. (O)(S) Verify work/rest cycles and fluid intake as a function of WGBT Index have been determined prior to start of operations and as necessary throughout the work day, see Appendix F.
3.	Check SOPs.	3. (O)(QC) Verify that SOPs are current and have been read and signed by all supervisors, leaders, and operators involved in the operation.
4.	Notification.	4a. (O) The OC, Occupational Safety and Health Office, and Surety Office will be notified of all surety operations to be conducted prior to operations start-up.

STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY (S), OPERATIONAL (O), QUALITY CHARACTERISTICS (QC)).
4.	Notification (con't)	4b. (O) The Occupational Health Clinic (OHC) will be notified by the Chemical Operations Supervisor of open door operations that require an Ambulance Team to be prepositioned within the CLA.
5.	Verify MINICAMS/Near Real Time Monitoring.	5. (O)(QC) Verify near real time (NRT) monitoring system(s) support is available for the operation.
6.	Report Unsafe/Unsecured Items.	6. (S) Discrepancies in Safety or Security will be immediately reported to the Director, Chemical Operations, Risk Management, Security, as well as OC, Senior QASAS, and the Surety Officer, with a written report to follow.
7.	Safety Briefing	7. Prior to start of Operations, Operations Lead/Supervisor will conduct an "All Hands" safety briefing. All personnel involved in the operation must be present for this briefing.

K. SPECIAL REQUIREMENTS:

1. Verify that appropriate Preventive Maintenance Checks and Services (PMCS) have been performed on equipment and vehicles IAW appropriate operating manual and/or regulations.

2. The use and distribution of government furnished hydration fluids (bottled water and sports drinks) will be monitored to ensure fluid use is only by authorized individuals. Hydration fluids will be maintained at Bldg 593 and issued each day based on the work plan and consumed in accordance with guidance. These fluids will not be used as a convenience item and personnel are always expected to bring in their own drinks or purchase the necessary materials for use during scheduled lunch/break times. Site supervisor will ensure compliance.

L. TOOLS AND TEST EQUIPMENT REQUIREMENTS:

ITEM	QUANTITY	SPEC/DWG	NSN
Barricades/Warning Signs	As Required	Locally Procured	N/A
First Aid Kit with Instructions	As Required	Locally Procured	N/A
Step Pans	As Required		8135-00-852-8178
Brushes	4 Each		7920-00-234-9317
Sponges	As Required		7920-00-559-8464
Liquid Soap (Alkaline)	As Required		7930-00-968-1527
Portable Eyewash Units, Capable of 15 minutes dispensing time	2 Each	NIIS	
Sodium Hypochlorite (5% nominal)	As required		6810-00-598-7316
Backboard	1 Each	Locally Procured	N/A
Blanket	2 Each	Locally Procured	
Plastic Containers for Protective Clothing	As Required		7240-00-000-0001
Plastic Bags	As Required		8105-01-195-8730
Plastic Sheets	As Required	Locally Procured	
Portable Shower	1 Each	Locally Procured	N/A
Flashlights	2 Each	Locally Procured	Various
Fire Extinguishers, Type 10BC or ABC	2 Each	Locally Procured	
Audible Alarm	1 Each	Locally Procured	N/A
Igloo Stick	1 Each	Locally Procured	N/A

ITEM	QUANTITY	SPEC/DWG	NSN
M8 Detector Paper (2 Lots)	As Required		6665-00-050-8529
Radios	As Required	Locally Procured	N/A
Forklift, 6,000 Lb (or over)/Gas/diesel	1 Each	Locally Procured	N/A
Forklift, 2,000 Lb (or over)/Electric (E, EE, ES OR EX) Clean-Burning Diesel	1 Each	Locally Procured	N/A
Protective Clothing	As Required	Various	
Protective Mask	As Required	M40 Series	4240-01-370-3821 small 4240-01-370-3822 med 4240-01-370-3823 large
Safety Glasses	As Required	Locally Procured	
Goggles, Splash-proof	As Required	Locally Procured	
Hearing Protection	As Required	Locally Procured	
Drinking Water Barrel	As Required	Locally Procured	7330-00-894-1269
Ladder (fiberglass/aluminum)	As Required		
Time Piece	As Required	Various	N/A
Wheel Chocks	2 Each	Locally Fabricated	
Fire Symbol 2	2 Each	Locally Procured	
Chemical Symbols			
SYMBOL 1 Set 1 (if used)	2 Each	Locally Procured	7690-01-081-9585
H	2 Each	Locally Procured	7690-01-083-1663
Leather/Leather Palmed Gloves	As Required	Locally Procured	N/A
Bottle, Insecticide Sprayer	1-gal min	Locally Procured	N/A
1000 CFM Portable Filtering Units	As Required	Locally Procured	
Bevels (for igloo entrance/exit)	As Required	Locally Procured	N/A
Defibrillator	As Required	Locally Procured	
Liquid Spill Kit	As Required	Locally Procured	
RTAP/MINICAMS support	As required	Locally Procured	
Bottled water	As required	Locally Procured	
Site Entry Record, PCD Form 40-173	As Required	Locally Procured	
Applicible MICP Inspection Checklist	As Required	Locally Procured	

OPERATIONS FORMAT

A. STANDING OPERATING PROCEDURE FOR: Chemical Operations

B. OPERATION NO.: 2

C. BAY NO.: N/A

D. SOP NO.: PU-0000-M-486 DATE: 12 Apr 65

E. REV NO.: 34 DATE: JUL 2 2012

F. CHANGE NO.: DATE:

G. OPERATION: Site Setup

H. EXPLOSIVE LIMITS: UNITS: Igloo Limits EXPLOSIVE LBS.: Igloo Limits

I. PERSONNEL LIMITS: OPERATORS: Various TRANSIENTS: Various

J.

STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY (S), OPERATIONAL (O), QUALITY CHARACTERISTICS (QC)).
1.	Change clothes as appropriate.	1a. (O) Personnel will pick up the level of protective clothing required for the operation at the change house. Specific assignments and corresponding protective clothing levels will be made by the chemical supervisor-in-charge.
		1b. (O)(S)(QC) Personnel will inspect their protective clothing for defects, such as missing buttons, broken snaps, tears, etc. Defective items will be returned to the change house attendant and replacement items obtained.
		1c. (O) Specific procedures for Change House Operation/PCE are contained in SOP PU-0000-M-501.
2.	Site Setup.	2a. (O)(S) As a minimum, a hot and cold side for the operation must be established and marked with the red rope prior to performing any additional tasks.
		2b. (O)(QC) Position chemical warning signs at the east and west ends of row that the operation will be conducted.

STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY (S), OPERATIONAL (O), QUALITY CHARACTERISTICS (QC)).
2.	Site Setup. (con't)	2c. (O) Position the following at the operational site: (1) Two Flashlights. (2) Two 10BC or ABC Type Fire Extinguishers (for loading and unloading operations). (3) Igloo stick. (4) 6,000 lb (or over) gas/diesel forklift. (5) Red rope (positioned to define the hot and cold side of the operation).
3.	Specific duties of the safety operator(s).	3a. (O)(S) Prior to opening the igloo door, monitoring will be conducted IAW SOP PU-0000-R-491.
		3b. (O) Monitor and respond to radio calls from the operational site.
		3c. (O)(S) Screen all personnel entering the row (See SPECIAL REQUIREMENTS).
	CAUTION: Safety operator(s) will have Level C2 protective clothing available for use. See Appendix C for definition of Levels of Dress.	3d. (O) Assist personnel in donning and removing protective clothing/equipment. Level C2 Protective Clothing with CPUs will be worn when assisting individuals being processed through the Mini Hot-Line.
		3e. (O)(S) All personnel will surrender their chemical badge to the Safety Operator at the van upon entering each storage location and will collect their badge upon exiting each location after completing all required operations inside the storage structure.
	NOTE: Do not white out or scratch out entries; line through erroneous entry 1 time, initial or sign, and annotate correct entry.	3f. (O)(S) Safety Operator at the van will maintain Site Entry Record, PCD Form 40-173 (latest version). Record all data per site entry form instructions. Record potential exposure time for each person between their first entering the igloo and upon exiting the igloo following completion of their activities. Original PCD Form 40-173 will be sent through the Laboratory to annotate monitoring results, completed forms will be sent to the installation Safety Office by the end of the week or when the sheet is filled, whichever comes first. The Safety Office will process the forms IAW PCD-R 385-12.
	NOTE: Safety Operator at the Van and the Lead Operator/Supervisor will be separate individuals; one will not perform the functions of the other. The Lead Operator/Supervisor is responsible for the overall coordination of activities and operational oversight.	3g. (O)(S)(QC) The Safety Operator will conduct a visual and/or physical inspection of Levels A, B, and C to verify proper fit and function of the equipment prior to personnel entering the structure.
4.	Remove Security Block.	4. (O) Utilize a 6,000 lb (or over) gas/diesel forklift to remove security block. Exercise care in removal as blocks are easily damaged.

STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY (S), OPERATIONAL (O), QUALITY CHARACTERISTICS (QC)).
4.	Remove Security Block. (con't) **CAUTION: Personnel will don protective mask when approaching within 14 feet of ventilators of an "unmonitored" chemical storage site IAW PCD-R 385-12.** NOTE: Care will be exercised when removing the "King Tut" block and when opening the doors to avoid disturbance of insects or snakes.	
5.	Remove Locks.	5a. (O) Chemical Operations and Security personnel, wearing butyl gloves will remove locks, secure to igloo and return upwind. 5b. (O) Proceed to appropriate operation.

K. SPECIAL REQUIREMENTS:

1. For operations involving leaking, handling, transport or movement of munitions the Mini Hot Line will be set up IAW Appendix A. For other operations, the equipment to set up the Mini Hotline will be available at the operation sit but remain in a standby status.

2. It is advisable to enter igloo operations from the upwind side. The Safety Operator may grant permission to enter unmasked from the downwind side only if operations do not involve the handling, movement, maintenance or air sampling of munitions and if air monitoring results do not indicate presence of agent.

3. Once monitoring of the igloo has been conducted IAW SOP PU-0000-R-491, security personnel may approach igloo unmasked and remove lock from the door if low level monitoring results are negative (verify results from RTAP operator). Butyl rubber gloves must be worn when removing lock.

4. All personnel present at the operation site must ensure that mobile radio transmissions are not made inside of the RTAP since interference with the equipment is possible. Required radio communication will be accomplished at least 10 ft away from the RTAP.

5. Two Type 10BC or ABC fire extinguishers will be placed on both sides of the apron (one on each side) near the door during loading and unloading of chemical munition operations.

6. Operators must perform and complete the applicable portion of the "Chemical Operation Section – Inspection Checklist" (MICP, Appendix B., Table Ib.) at least monthly. During open door operations, operators will complete the "Daily During Chemical Operations" (MICP, Appendix B., Table Ia.) portion of the checklist for each storage structure entered during the day in accordance with the MICP.

L. EQUIPMENT, TOOLS, GAGES AND SUPPLIES. (See Operation 1, Paragraph L)

OPERATIONS FORMAT

A. STANDING OPERATING PROCEDURE FOR B. OPERATION NO. 3

Chemical Operations C. BAY NO. IGLOO No.

D. SOP NO. PU-0000-M-486 DATE: 12 Apr 65

E. REV NO. 34 DATE: JUL 2 2012

F. CHANGE NO. DATE:

G. OPERATION: First Entry Monitoring (FEM)

H. EXPLOSIVE LIMITS: UNITS Igloo Limits EXPLOSIVE LBS. Igloo Limits

I. PERSONNEL LIMITS: OPERATORS 6 TRANSIENTS: 2

J.

STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY (S), OPERATIONAL (O), QUALITY CHARACTERISTICS (QC)).
1.	Prior to Entry. NOTE: All operators will be trained in the proper donning/doffing of Protective Clothing and Equipment (PCE).	1a. (O)(S)(QC) Prior to entry, monitoring will be performed IAW SOP PU-0000-R-491. Monitoring results will be verified prior to approaching the igloo.
		1b. (O)(S) The Safety Operator(s) will assist, when necessary, with the checks for fit and function of protective ensemble of all crew members involved in the operations prior to opening the igloo door and first entry (applies only to Levels A, B, and C2).
		1c. (O)(S) The Site Lead/Supervisor will conduct a "Tailgate" safety brief for personnel involved in operations prior to entry of the first location by the team. The Site Lead/Supervisor will assure that a START card/form is completed to document the "Tailgate" briefing. Each attendee will sign the START card/form indicating their attendance.
		1d. (O)(S) If near real time (NRT) monitoring results are negative, masked personnel may enter the structure in Level D (boots & gloves worn) (see Appendix B)

STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY (S), OPERATIONAL (O), QUALITY CHARACTERISTICS (QC)).
1.	Prior to Entry (con't)	1e. (O)(S) If NRT monitoring results indicates a potential detection of mustard agent a TMH in Level D/mask and gloves worn will close the igloo door; in the absence of a TMH on site, RTAP operator will contact Site supervisor and perform conformation IAW SOP PU-000-R-491. Notify the Operations Center and evacuate upwind. Agent confirmation will be performed IAW SOP PU-0000-R-491; if confirmed, follow procedures in Operation 7 through 13, as appropriate. If mustard agent is not confirmed, resume normal operations.
2.	Open Igloo Door.	2a. (O) Operator will call P10 (Post 5) by phone or radio to notify them of their intent to access the storage structure. Personnel at Post 5 will deactivate the IDS.
		2b. (O) Using the igloo stick, Operator will open igloo door when instructed.
		2c. (O) A Safety Operator will notify the OC when entry is made and will observe the operation from the cold side.
3.	Perform Visual Inspection.	3a. (O) Operators will visually inspect stationary sampling lines for damage. Operators will ensure that sample lines are placed in accordance with PCD-R 50-3; Sample line 1 (front) will be positioned approximately 20 feet from the igloo door and approximately 5 feet from the floor down the center/main aisle. Sample line 2 (rear) will be positioned approximately 20 feet from the rear of the igloo and approximately 8 feet from the floor down the center/main aisle.
	WARNING: PERSONNEL MUST PAY CAREFUL ATTENTION TO THE CONDITIONS OF AMMUNITION STACKS WHILE INSPECTING THE INSIDE OF THE IGLOO.	3b. (O) Both operators will proceed to the rear of the igloo and conduct a thorough visual inspection of the igloo and its contents for evidence of contamination, leakage or hazardous conditions (peeling, discolored, or blistered paint, or the presence of liquid). Using a flashlight, operators will inspect each accessible item of the stacks while maintaining visual contact with each other. Operators will thoroughly inspect igloo floor for evidence of liquid. Repeat this procedure until the entire igloo has been inspected.
	NOTE: H-series agents act as solvents on most paints, causing the paint to peel, dissolve, or discolor, which may indicate leakage of these agents.	3c. (O) If operators visually observe excessive rodent droppings they will report observation to site supervisor and a clean-up operation will be scheduled. See SPECIAL REQUIREMENTS.
4.	Verify Liquid Leakage.	4a. (O)(S) If the visual inspection reveals suspect liquid without a MINICAMS alarm, personnel will immediately exit the igloo and close the door. Personnel (wearing Level C2 PCE, minimum) will re-enter and test the suspected liquid with M8 paper. If confirmed agent, personnel will exit the igloo, close door and ventilators and process though the Mini Hot-Line. Filter emplacement operations will be conducted IAW Operation #10.

STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY (S), OPERATIONAL (O), QUALITY CHARACTERISTICS (QC)).
4.	Verify Liquid Leakage. (con't)	4b. (O)(S) Area NRT monitoring will be performed IAW SOP PU-0000-R-491. In the event the MINICAMS alarms, the RTAP operator will immediately sound the alarm, the operators will exit the igloo and initiate decontamination processes through the Mini Hot-Line.
		4c. (O) Isolation, decontamination, containerization, and transportation of leakers will be performed IAW Operations 4, 9, 10 and 11, of this SOP.
5.	Personnel Protective Clothing.	5a. (O)(S) Prior to entering the change house for lunch or breaks, all TAP clothing used in TCM operations will be removed and left at the work site or outside the Change House.
		5b. (O)(S)(QC) At the completion of the day's operation, protective clothing worn during first entry monitoring, and not subjected to agent liquid or vapor contamination, will be aerated for at least 12 hours prior to reuse. This protective clothing will be laundered once every three months as a minimum, IAW DA PAM 385-61.
		5c. (O)(S) Protective clothing worn in known or suspected agent contaminated areas will be handled IAW Operation 11.
6.	Close and Secure Igloo.	6a. (O)(S) Prior to igloo door being closed the two operators assigned as the first entry team will proceed to the rear of the igloo and conduct a thorough visual inspection of the igloo to ensure all personnel have exited the igloo. Operators will report findings to the Site Lead.
		6b. (O)(S) Site Lead will conduct an "all clear" at the igloo door. Notify assigned key control personnel to replace locks, Inform Security that operations are complete.
		6c. (O)(S) Using a 6,000 lb. or over forklift MHE personnel will place security block in position over the spike using care when replacing block as they are easily damaged. Once completed Site Lead will report completion to the Safety Operator at the van.
	NOTE: Safety Operator at the van will ensure both the exposure log is annotated with the exit time for all personnel that entered the igloo and a positive check has been made that all badges have been returned to the appropriate personnel.	6d. (O)(S) Safety Operator at the van will then notify the OC, by phone or radio, that igloo is clear, secure and King Tut has been returned and that operations are complete.

K. SPECIAL REQUIREMENTS:

1. Transient personnel may enter during First Entry operations only when required by DAIG-CSI, Chemical Surety Management Review (CSMR), local inspections, or training.

2. Operator will spray rodent droppings with bleach and let soak for 20 minutes prior to removal. Bag all droppings and seal bag, prior to placing in an enclosed outdoor container. A minimum of Level D with a NIOSH full-face respirator with P100 filters and organic vapor cartridges will be required during these clean up operations.

STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY (S), OPERATIONAL (O), QUALITY CHARACTERISTICS (QC)).

3. Operators must perform and complete the monthly portion of the "Chemical Operation Section – Inspection Checklist" (MICP, Appendix B., Table Ib.) at least monthly. During open door operations, operators will complete the daily portion (MICP, Appendix B, Table Ia.) of the checklist for each storage structure entered during the day in accordance with the MICP.

L. EQUIPMENT, TOOLS, GAGES AND SUPPLIES. (See Operation 1, Paragraph L)

OPERATIONS FORMAT

A. STANDING OPERATING PROCEDURE FOR: **Chemical Operations**

B. OPERATION NO. 4

C. BAY NO. N/A

D. SOP NO. PU-0000-M-486 DATE: 12 Apr 65

E. REV NO. 34 DATE: JUL 2 2012

F. CHANGE NO. _____ DATE: _____

G. OPERATION: Storage, Handling, and Transport Procedures

H. EXPLOSIVE LIMITS: UNITS Igloo Limits EXPLOSIVE LBS. For Truck:
UNITS (Truck) 300 210 – 4.2 INCH 90 -105MM
300 160 – 155MM
192

I. PERSONNEL LIMITS: OPERATORS 16 TRANSIENTS: 6

J.

STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY (S), OPERATIONAL (O), QUALITY CHARACTERISTICS (QC)).
1.	Prepare for operation.	1a. (O)(S) At both the shipping and receiving igloo, set up a Mini Hot-Line (Appendix A) and perform First Entry Monitoring IAW Operation 2 and 3 of this SOP. Continuous monitoring of both sites will be performed IAW SOP PU-0000-R-491.
		1b. (O)(S) A mobile secondary hotline (Appendix A) with a minimum of 2 operators will be on standby inside the chemical limited area, (if operators are not available for standby, the secondary hotline will be setup prior to beginning of operation) but remain outside the temporary exclusion area for current operation. In the event of a chemical accident/incident the mobile unit will be deployed a minimum of 450 meters up wind from the accident/incident. Leader/Supervisor on site will determine set-up location based upon the hazard analysis and current weather conditions.
		1c. (O) Inventory personnel will initiate DA Form 4508 and provide planographs for both origin and destination locations.
	NOTE: An area with controlled access in and out is sufficient for establishment of an exclusion area.	1d. (O)(S) Establish a temporary exclusion area for loading/unloading operation large enough to accommodate a vehicle used to transport the munition item and all operations incident to the movement.